



BIA Scotland response to the Scottish Executive Consultation on Science and Innovation Strategy for Scotland

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BiolIndustry Association Scotland

BiolIndustry Association (BIA) Scotland is the trade association for innovative enterprises in Scotland's bioscience sector. We represent over 60 members, the majority of which are involved in realising the human healthcare benefits that life sciences promise.

Our mission is to promote the human health benefits of new technologies encouraging the commercial success of the bioscience industry by focusing on emerging enterprise and the related interests of companies with whom such enterprise trades. The dual pillars which underpin the work of the BIA (Scotland) are advocacy and business support. In practice, this entails working to achieve the policies that will fully establish bioscience as a successful, mainstream contributor to the Scottish economy, as well as giving companies the opportunities, training, information and contacts they need to succeed.

BIA Scotland (BIAS) welcomes the opportunity to input into the **Strategy for Science and Innovation for Scotland**. It is very encouraging to see the inclusion of 'innovation' as core to future strategy development. Innovation, as described by the DTI is defined as "the successful exploitation of new ideas"¹.

The life sciences sector is an economic success story for Scotland and BIAS believes that life sciences innovation will have an important part to play in realising a healthy, wealthy Scotland.

The life sciences sector is international and competitive and there are an ever-growing number of countries looking to increase their potential in this industry. Although Scotland is one of the UK's key life sciences locations, the right conditions are important for the sector to grow and for the high added value jobs to stay here. This includes education and training to ensure that industry has access to a home-grown skills pool and Scotland's people have the best possible career opportunities.

¹ <http://www.dti.gov.uk/innovation/index.html>



Both industry and government will have to work hard together to ensure that this sector maintains and builds on its success for Scotland and can deliver innovative medicines for Scottish patients. BIAS and its members are glad to be part of the debate about developing the best Strategy for Science and Innovation to allow the life sciences sector to deliver innovation for a healthy, wealthy Scotland.

Here we set out what we see as the key factors, under each theme of the consultation, which are important for our continued success as part of a thriving Scottish economy and to realise the human healthcare benefits that life sciences promise.

BIAS would be happy to engage further with the Scottish Executive and the Chief Scientific Adviser on any aspect of this consultation response.

Kind Regards,

A handwritten signature in black ink that reads "Barbara Blaney".

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BIA Scotland response to the Scottish Executive Consultation on Science and Innovation Strategy for Scotland

For clarity, any text reproduced from the consultation will be highlighted in blue, with BIAS response or recommendation in black.

Definition of Science and Innovation

10. We do not intend to limit the terms “science” or “innovation” in future strategy to a particular set of disciplines or areas of the economy. “Science” should therefore be taken to include all activity in the pursuit of systematic knowledge which benefits, or is likely to benefit, the economy or society in some way. Similarly innovation should be taken to include all activity that is designed to introduce new products or processes, including those in the service sector.

BIAS welcomes this definition of innovation for future strategies going forward. BIAS notes that innovation, as described by the DTI is defined as “the successful exploitation of new ideas”². Indeed, as noted in our recent Manifesto for the Life Sciences in Scotland³, the definition of innovation can be a barrier to industry utilisation of current funds for product development purposes. For example, SMART and SPUR+ (innovation support grants administered by the Scottish Executive) have enabled a significant number of Scottish life sciences companies to further research and development in specific innovative areas, however, they cannot be used to offset clinical trial costs. Clinical trials are an essential part of the safety, efficacy and regulatory process in the development of new medicines. **A broader definition of innovation may allow the offsetting clinical trial costs to progress product development under current government funding initiatives.** BIA Scotland recommends that the offsetting clinical trial costs should be allowed under SMART and SPUR+ and the definition of innovation is currently a barrier to utilisation of these funds for this purpose.

² <http://www.dti.gov.uk/innovation/index.html>

³ BIA Scotland – A Manifesto for the Life Sciences in Scotland.
http://www.bioindustry.org/biodocuments/Manifesto/BIA_Scotland_Manifesto.pdf



A Science and Innovation nation

11. Figure 1 shows the main players in a science and innovation nation; how they relate to one another in broad terms and lead to benefits for the economy and society. A major aim of the updated strategy will be to enhance connectedness between the elements in this system, and so build a virtuous circle of growth.

BIA Scotland believes that a major stakeholder group has been omitted from Figure 1. This is the patient population of Scotland who can directly benefit from delivery of innovation from the life sciences sector indigenous to Scotland in terms of new medicines and medical devices but also from the global life sciences sector. More than 250 million patients worldwide have already benefited from approved biotech medicines and therapies to treat or prevent heart attacks, multiple sclerosis, breast cancer, cystic fibrosis and leukaemia, for example⁴. It is BIA Scotland's view that the perspective of Health needs to be integral for any Strategy for Science and Innovation for Scotland, to ensure that joined up government can deliver both a wealthy and a healthy Scotland.

Furthermore, in the Figure, there is no role indicated for bodies such as Trade Associations and Research Councils to influence and contribute to the benefits for a science and innovation nation.

⁴ EuropaBio Healthcare Biotechnology Guide



THEME 1: MAINTAINING AND DEVELOPING THE EXCELLENCE OF THE SCIENCE RESEARCH BASE

BIAS broadly agrees with the long term and short term aspirations set out under this theme. However, we would like to make the following suggestions for inclusion:

General

The role of technology foresighting should be emphasised as a powerful tool in recognising opportunities and strengths to expand the research base. It is vital to ensure that Scotland is fully linked in with the UK Technology Strategy Board⁵ and initiatives such as the Bioscience Futures Forum⁶ (BFF) to allow Scotland to capitalise fully on new opportunities as they arise.

As stated in the strategy it is essential that public agencies in Scotland work together with UK counterparts to further the capabilities of Scotland and attract investment.

In terms of maximising Scotland's responsiveness to new opportunities BIAS believes that there needs to be a harmonisation of approach from all stakeholders including the public sector, research councils, technology transfer offices and the private sector/industry. Without dampening aspirations for future of Scotland as a science nation, future strategy should reflect the realism of what can be achieved in a given timeframe.

A co-ordinated approach across all stakeholders will in turn allow a stronger clearer voice for Scottish science both at home and abroad.

Excellence in the science Research base

- **Teaching versus Research excellence**

In terms of funding allocation, there is a case to be made that distinguishing between HEIs that are excellent at research from those that specialise in teaching may further promote the strengths of our research base.

⁵ http://www.bioindustry.org/cgi-bin/contents_view.pl?SITE_ID=321&ID=322

⁶ http://www.bioindustry.org/cgi-bin/contents_view.pl?SITE_ID=321&ID=322



- **The cost of quality science graduates**

Academic Institutions in the UK are effectively being financially discouraged to produce "science" graduates in specific areas as the financial cost of a science graduate is higher given the practical skills that need to be taught. i.e. the total number of graduates (regardless of discipline) for a given unit of cost seems to be rewarded in government metrics. Solutions would be to revise the metrics by which academic institutions are rewarded for producing science graduates and maintaining the facilities and funding available to do this.

- **The Research Assessment Exercise (RAE)**

The metrics and criteria for future RAEs could provide an opportunity to build on the technology transfer activities of HEIs in promoting commercialisation of research. BIAS suggests that IP/patent activity or current commercialisation activities should be considered in the RAE process alongside research income to engage the academic community more with the rewards of commercialisation for the longer term (reference next section).

- **Capturing and exploiting intellectual property (IP)**

Intellectual Property Rights (IPR) in the form of patents and proprietary data are key, valuable assets to all companies in biomedical sciences and are arguably much more important in the biotechnology, pharmaceutical and medical technology sectors than in any other industrial sector. Given the time and investment required to get new treatments through the regulatory process, they are an essential prerequisite for all development and commercialisation investment decisions.

An effective system for the protection and exploitation of intellectual property arising from funded biomedical research will be essential to give the best chance of innovations and discoveries reaching patients and at the same time resulting in valuable knowledge transfer that can grow the Scottish life sciences sector. The intellectual property strategy has to be appropriate for any individual innovation and the process of engaging with commercialisation partners has to be established.

Clarity of IPR ownership is perhaps the most important issue. A lack of clarity increases the risk for any licensee or investor, both the risk of deal failure and the risk that the IPR itself will be challenged in the future. It should be clear who owns the IPR, who is responsible for licensing the IPR and what the reward split between the parties should be (inventor : institution : funder).



Any commercialisation partner (be they a licensee investing cash and development resources, a financial investor investing cash or an entrepreneur investing time energy and reputation in a potential biomedical innovation) will only put effort into the complex negotiation, due diligence and legal processes for gaining rights to the intellectual property behind such innovation if there is a clear process to negotiate for the rights and where they deem there is a high chance of success. Experienced business development and licensing professionals all have horror stories about the difficulty of trying to deal with multiple and inexperienced parties and more often than not these end in failure.

Two essential components of an effective intellectual property and knowledge transfer strategy from funded biomedical research are:

1. A sophisticated process for identifying and protecting intellectual property that is likely to be of commercial value
2. A clear and professional process for engaging with commercialisation/exploitation partners to give the maximum chance of future investment in innovations and hence their chance of getting to patients.

Some of the issues that need to be addressed in this are:

- Patents have to be well crafted by professionals who know the field and with a clear idea of the potential applications of any innovation (poorly drafted patents with inadequate claims can destroy the commercial potential of a product). Patents should be crafted to obtain broad international protection;
- The protection strategy should take account of the need for further substantiation data which may arise from ongoing funded research;
- Patent filing needs to be coordinated in a timely fashion in relation to both the licensing process and the academics/clinicians desire to publish. In some circumstances publication may have to be delayed to allow appropriate protection;
- Clarity of inventorship is necessary otherwise patents will be compromised;
- Realistic expectations of financial returns also need to be established either as license fee/royalty expectations or as equity split in the case of spin out companies;
- The business development / technology transfer process needs to be managed by professional specialists and learn from best practise in the field (e.g. CRT, MRCT and some of the top University TTOs such as ERI. It is essential that for any piece of IPR exploitation that a single Technology Transfer Organisation (TTO) has responsibility and ability to execute. Multiple party negotiations are always higher risk;
- The single research budget should consider using the existing specialist TTOs as an efficient route for exploitation (MRCT, CRT etc) and where no specialist Technology Transfer organisation exists e.g. in areas of MedTech, Medical Devices, Diagnostics and new areas like Translational Medicine the fund should consider establishing such specialist groups;
- The goal of the exploitation TTO should be to find the most suitable partner/commercial vehicle that will get the innovation to patients and not necessarily the partner who will pay the largest upfront licensing fees (CRT and CRUK has been particularly successful in applying these criteria). Clearly there should also be a reasonable financial return from this; and



- A portfolio balance of licensing deals and spin-out should be expected from this work and a balanced portfolio should be one of the metrics of success;
- For larger complex initiatives involving multiple parties with the potential for substantial IPR generation (e.g. the recent £50 million investment to create a Scottish Translational Medicine Research Collaboration with Wyeth Pharmaceuticals www.scottish-enterprise.com/sedotcom_home/news-se/news-fullarticle.htm?articleid=154852), in these cases it is essential to get an IPR and exploitation framework agreed upfront; and
- In some circumstances much value may be gained from pooling IPR between different research projects; where appropriate this should be considered.

Recommendations

- Establish clear IPR ownership as a prerequisite for release of a grant;
- Establish clear responsibility for IPR exploitation as a prerequisite for release of a grant;
- Establish clear value split between parties resulting from IPR exploitation as a prerequisite for release of a grant (or a clear process for determining a split);
- Consider centres of excellence for IPR exploitation using existing organisations (e.g. MRCT and CRT) where appropriate;
- Consider the creation of specialist TTOs where none exist (e.g. SHIL in Medical devices);
- Allocate a proportion of the fund budget for patenting and IPR exploitation;
- If the appropriate TTO elects (in a timely fashion) not to patent or exploit a technology/innovation, the inventors should be free to exploit with a defined small percentage of reward returning to the fund/institution;
- The decision on what to patent and what to exploit needs to be rapid and effective so that inventors whose ideas are not backed can still be exploited and benefit patients and the economy;
- Establish a mechanism for IPR pooling across disparate groups, perhaps through existing ITI institutes; and
- Establish a strategy (taking into account all the ethical considerations) for exploitation of the IPR embodied in NHS patient/treatment /outcome records, which is a potentially valuable and unique resource.

- **The Impact of Full Economic Costing (FEC)**

BIAS has concerns regarding the impact of FEC on Higher Education Institutes (HEIs) and industry.

With respect to HEIs, there may be a negative impact on intensive practical courses and also animal research. Preliminary studies are often essential to gain data for grant funding submissions. If researchers need to apply FEC for such studies there is a chance that they are less likely to occur, thus the chance of obtaining grant funding may be lowered. It should be a consideration for the Scottish Executive as to how FEC will be financially supported in the long term for the academic sector.

From an industry perspective, the industry-academic relationship has been further strained by the introduction of FEC. This is seen by the industry as utilising industry to finance academia.



An alternative system could be a change regarding the IP status of research carried out in such a collaboration (see section above on IP).

In general, questions that need to be addressed in the strategy are:

- How will the policy of FEC be supported?
- Is the ITI model applicable for horizon scanning to expand the research base?
- Once new opportunities are identified, who will determine how they will be funded?

Long term aspirations should be placed in the context of the input and funding placed by the private sector to ensure that innovation can thrive and continue to attract company activity to Scotland.



THEME 2: ENHANCING INTERNATIONAL CONNECTIONS AND CAPTURING OVERSEAS INVESTMENT

BIAS's main concern for this section is that to meet the objectives of this theme it must be realised that there will be a significant cost to be borne by the public and private sector in stimulating further opportunities, generating infrastructure, securing jobs and salaries – in short there is a need to achieve the critical mass that is so attractive for overseas investment.

Scottish Executive policy emphasises the need for Scotland to become an increasingly knowledge-intensive economy if it is to be competitive at a global level. A strong and growing life sciences sector has been explicitly identified as a key engine for growth for Scotland⁷. The life sciences sector is growing in Scotland as the UK bioscience sector itself matures.

- **Growing What We've Got – Fostering Existing Innovation**

In addition to the emphasis placed on attracting overseas investment, BIAS believes that there should be an **equal focus** on fostering existing innovation by supporting the established companies we have in Scotland. This is critical to growing our life sciences cluster to critical mass. The climate for doing business in Scotland must be flexible to ensure that we retain our global and emerging businesses here, with all the benefits to the economy that brings.

Currently, with limited public support mechanisms for companies beyond SME status there is increasing competition for available funds.

- **Capitalising on available funds through the EU**

With an increased budget and a more favourable outlook on SME participation, the next Framework Programme FP7 could be a tangible source of funding for promoting innovation in Scotland. BIAS suggests that there should be **flexible** funding support available to SMEs to allow effective utilisation of FP7 opportunities.

⁷ http://www.scottish-enterprise.com/sedotcom_home/about_se/what_we_do/operating-plan.htm



THEME 3: INTENSIFYING KNOWLEDGE EXCHANGE BETWEEN ACADEMIA AND BUSINESS

- Maintaining the Pipeline of Support

BIAS welcomes initiatives such as Interface⁸ and agrees that the pipeline of support should be further developed, from the Life Science Business Advisory Service⁹ (LSBAS) to the funding initiatives available for commercialisation of research from the science base.

Schemes such as SEEKIT and SCORE should be maintained and well funded to maximise knowledge exchange opportunities.

⁸ <http://www.interface-online.org.uk/>

⁹ http://www.scottish-enterprise.com/sedotcom_home/sig/life-sciences/biotechnology-initiatives/business-advisory-service.htm



THEME 4: EXPANDING BUSINESS INNOVATION

The role of government should be to lay and strengthen the foundations for any industry sector to establish, grow and thrive. BIAS believes that by providing a stable supportive business environment, with well connected transport infrastructure and skilled workforce, Scotland can capitalise on its strengths and further R&D investment will follow. BIAS suggests the following to promote and expand business innovation:

Fostering Existing Innovation

Fostering existing innovation by supporting the established companies we have in Scotland is core to growing our life sciences cluster to critical mass. The climate for doing business in Scotland must be flexible to ensure that we retain our global and emerging businesses here, with all the benefits to the economy that brings.

- **Business rates**

Proposals to reduce business rates to UK levels in April 2007 are to be welcomed as this represents a substantial part of business costs in Scotland. Indeed, we would like to see business rates even further reduced - reducing taxation will help the industry to grow and thrive.

- **R&D Tax Credit**

BIA S recognises the importance and value of raising the profile of the benefits of business R&D (ref link to OECD activity and subsequent increase in GDP). Within the life sciences sector, innovation is high yet company formation is down. Scotland has a fully represented cluster; however the number of R&D companies has not kept pace with the corresponding increase in the supply chain.

The role of government should be to lay and strengthen the foundations for any industry sector to establish, grow and thrive. BIAS believes that by providing a stable supportive business environment, with well connected transport infrastructure and skilled workforce, Scotland can capitalise on its strengths and further R & D investment will follow.



- **Capitalising on EU Commission Guidelines**

The European Commission has just published new state aid rules¹⁰ – backed by a communication on tax incentives to stimulate R & D¹¹. The new rules recognise the ‘Young Innovative Enterprises’ (YIE) status as an eligibility criterion for state aid. This will enable Member States – who so wish - to provide extra public funds like tax and other financial incentives to their young innovative biotechnology companies without running into trouble with EU competition rules. In addition to the R&D tax incentives communication, the new EU rules enable governments to give extra incentives of up to €1 million to small companies that are less than 6 years old and spend 15% or more of their revenues on R&D. With effect from January 1st, 2007, the new EU rules, which are not sector specific, will benefit research, development and innovation across Europe.

BIAS expects that these measures will encourage more private and institutional investors to invest in life sciences companies which need to raise substantial sums of money to meet the increasingly high costs of research and development.

- BIAS calls on the Scottish Executive to seize this opportunity – France and Belgium have done so already.

What is the opportunity for the life sciences?

Life sciences companies are amongst the main beneficiaries of the existing R&D relief available to SMEs and a large proportion of current and future start ups would also fall within the criteria set out in the paper for YIEs. The additional support that this could offer would be invaluable to both these innovative companies, and companies in many other industries that are at this very early stage.

However, as the UK R&D legislation is currently drafted, SMEs would be precluded from claiming the R&D relief if they took advantage of such a new incentive. The legislation specifically excludes expenditure if a notified state aid is, or has been, obtained in respect of the whole or part of the expenditure, or any other expenditure attributable to the same research and development project.

¹⁰<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1600&format=HTML&aged=0&language=EN&guiLanguage=en>

¹¹<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1598&format=HTML&aged=0&language=en&guiLanguage=en>

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- Given that this is not a devolved matter and to ensure that Scotland is not disadvantaged, BIAS would ask that the Scottish Executive urges the UK Government to amend the R&D legislation such that the two incentives, and any of the other incentives suggested by the EC paper, could be utilised by the sort of companies that the guidance envisages. This is already the case in France, where innovative companies benefit from both R&D tax credits and Young Innovative Company status. A level playing field is needed.

Small Business Research Initiative (SBRI)

The Small Business Research Initiative is designed to increase the success of smaller businesses in obtaining contracts from Government bodies to conduct research and development.

The Research and Development (R&D) procurement programmes of Government Departments and the Research Councils are being made more accessible to smaller businesses. The Government Departments involved will aim to buy at least 2.5% of their R&D requirements from smaller businesses.

The Research Councils, although not Government Departments, are supporting a specific Small Business Research (SBR) scheme that recognises the specific nature of Research Council funding. The Research Councils will move to meet the same 2.5% R&D targets over time giving the total target of £50 million worth of Government research to be bought from smaller firms.

The SBRI aims:

- to provide opportunities to those existing small firms whose businesses are based upon providing R&D - by increasing the size of the market
- to encourage other smaller businesses to increase their R&D capabilities and capacity - to exploit the new market opportunities
- to create opportunities for starting new technology-based or knowledge-based businesses

The initiative is open to all businesses. However it is particularly beneficial to Small Medium Enterprises (SME's). Charities, university spin-offs, individuals and groups are eligible to participate if they fulfil the above criteria.



As part of the review process into further developing the opportunities for R&D, BIA S consider the SBRI an important opportunity to enhance engagement with the business community.

The recently published Cooksey Report¹² recommended that a Working Group be set up to look at improving SBRI.

- BIAS would recommend that the Scottish Executive should ensure that the Scottish life sciences sector is included in such a group.

Supporting Innovation

- **Ensuring Long-Term Support for Development**

BIA Scotland believes that there is a good level of support for the life sciences sector in Scotland; however this needs to be maintained and refined as the needs of our growing industry change. Scotland has led the way in terms of developing pipelines of support for its emerging life-science companies. Financial commitment from Seed Funding right through to initiatives to attract Venture Capital should improve the financial environment for early stage bioscience companies.

To date the majority of public sector support has been for academia and SME enterprises. With an increase in the numbers of merger and acquisitions, there are now a significant number of companies that can no longer be considered suitable for SME status and thus there is a need to rethink regarding support for larger enterprises.

- **Sustaining Funding Initiatives**

The Proof of Concept for Investor Readiness Programme¹³ has been developed over several years. The fund is now a valuable support to academia and industry alike, and should be continued. This successful programme is now viewed as a 'best practice model' and other countries are looking to Scotland to develop similar initiatives. The Proof of Concept Fund in Scotland has led to 21 spin-out companies, three start-ups, 22 license deals and 12

¹² Cooksey Review 2006,

http://www.hm-treasury.gov.uk/independent_reviews/cooksey_review/cookseyreview_index.cfm

¹³ ref



collaborative partnerships. BIA Scotland looks forward to seeing real results continue with the continued implementation of this programme.

- Government must maintain financial commitments to this sector. BIA Scotland welcomes the launch of the Scottish Seed Fund and the Scottish Venture Fund which aims to address the funding gap for growing companies seeking risk capital investment.

BIAS recently published a Manifesto for the Life Sciences in Scotland¹⁴. The following recommendations were made in further support of expanding innovation through supporting the life sciences sector:

Offsetting clinical trial costs to progress product development

SMART and SPUR+ (innovation support grants administered by the Scottish Executive) have enabled a significant number of Scottish life sciences companies to further research and development in specific innovative areas, however, they cannot be used to offset clinical trial costs. Clinical trials are an essential part of the safety, efficacy and regulatory process in the development of new medicines.

- Offsetting clinical trial costs should be allowed under SMART and SPUR + and the definition of innovation is currently a barrier to utilisation of these funds for this purpose.

ITI Life Sciences to focus on technology foresighting for future markets

Life Sciences is a risky business -the high costs of bringing a medicine to market and the long lifecycle means that it takes far longer to reach profitability than companies in other sectors. The Intermediary Technologies Institutes (ITIs) are an innovative Scottish concept turned reality, set up to deal with this risk. One of their aims is to identify market opportunities which Scotland is well-placed to exploit and capitalise on those areas. The ITI for Life Sciences is a positive development. There needs to be renewed long-term commitment to the ITIs, especially in the case of the ITI Life Sciences due to development and regulatory timescales.

¹⁴ http://www.bioindustry.org/biodocuments/Manifesto/BIA_Scotland_Manifesto.pdf



- ITI Life Sciences needs long-term financial commitment to allow it to deliver.

Networking Business Through Transport Infrastructure

The availability of scheduled flights to a range of business destinations in recent years, often supported by the Scottish Executive's Route Development Fund, has been of great benefit to many sectors. BIA Scotland would like to see a continuation and expansion of this programme. Investment in domestic transport infrastructure is also key. Scotland's transport network currently falls short by international standards.

- Continued investment in Scotland's transport infrastructure is important for the future success of our industry. We welcome the commitment to upgrade the M74 and invest in a Borders Rail Link, and recent announcements of Edinburgh-Munich air route and ensuring road transport links through a new Forth Road Bridge project.



THEME 5: MODERNISING SCIENCE EDUCATION AND PROMOTING SCIENCE CAREERS

Excellence in science education is key to strengthening our knowledge economy. BIA Scotland supports the recommendation of the Scottish Science Advisory Committee (SSAC) that to realise the vision for a 'Smart, Successful Scotland'¹⁵, Scotland needs to have the best scientists at all levels, from school pupil to research leader. Furthermore, developing, attracting and retaining a high quality scientific and managerial talent base are vital if we are to maintain sustainable competitive advantage in the Scottish life science sector.

It is essential that there is a **joined up** approach within the Scottish Executive Departments of Education, Enterprise and Life Long Learning and Health to make this happen through the Science Strategy for Scotland and appropriate consultation with the industry.

BIAS would like to make the following points for consideration:

- **Instilling Interest in Science Through the Years – More 'Hands On' Teaching**

BIA Scotland is concerned about the erosion of 'hands on' practical experience of science throughout the educational curriculum¹⁶.

Greater investment is needed throughout the education system, from primary school to universities to allow more teaching of 'practicals', which are crucial tools for engaging students at a young age; maintaining interest throughout secondary school and providing exposure to core skills relevant to the industry at University level.

Schemes such Small Grants for Science¹⁷ are a step in the right direction and BIA Scotland believes that school budgets should reflect the need for science education, not rely on grant applications.

- More 'hands on' teaching at all levels and a simplification of funding at secondary level would greatly assist in instilling interest in science.

¹⁵ <http://www.scotland.gov.uk/library3/enterprise/ssss.pdf>

¹⁶ Campaign for science and engineering reported that 87% of Scottish secondary schools are cutting practical classes, <http://www.savebritishscience.org.uk>, need precise ref

¹⁷ The scheme offers grants of between £500 and £2,500 per project. It has a budget of £270,000 together

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- **Science as an Attractive Career Choice**

While the numbers graduating from Scottish higher education institutions with science and engineering subjects are increasing, between 1995-2004 the numbers of students taking science subjects at Higher level has declined¹⁸. Indeed, the increasing numbers of biology graduates has been at the expense of physical sciences including chemistry, a core discipline for this industry. If we fail to retain an interest in science as a career it will have a damaging effect on the number of future graduates and seriously undermine the knowledge economy and skills base. The decrease in production of good quality graduates means that the life sciences sector will have a limited time in which there is an advantage in terms of the capabilities of the locally available workforce.

- BIA Scotland would like to see a coordinated approach by the Scottish Executive departments of Education and Life Long Learning to bring about sector specific/focused careers advice within schools and the further education sectors, and would be happy to assist with its implementation.

BIA Scotland engages with **Generation Science, the SAPS Programme, The BBSRC Biotechnology YES programme**. Other examples of education initiatives include **Careers Scotland** in partnership with Scottish Enterprise Electronics Team and the European Social Fund which will deliver Science and Technology Matters (STEM) for Scotland. **Biomedical Horizons** is a project to raise awareness of biomedical sciences, careers and career pathways by engaging the public in exploration and discussion with practitioners. The **Researcher in Residence scheme** (funded by RCUK and the Wellcome Trust, based at University of Edinburgh) facilitates a placement of researchers in schools throughout the UK to stimulate pupils interest and motivation in the sciences and develop researcher communication skills.

- **Ensuring Education Meets the Needs of Industry**

The European Commission recently called for the establishment of innovation-friendly education systems in a strategy to translate investments in knowledge into products and services¹⁹. Currently there is no shortage of science graduates in Scotland but skills are not best suited to the needs of this dynamic and innovative industry.

¹⁸ Source - Annual Statistics Reports from The Scottish Qualifications Authority

¹⁹ IP/06/1181, A broad-based innovation strategy for the EU: Commission calls for action at national and European levels



A recent survey of BIA members²⁰ highlighted concerns including limited opportunities for postgraduates without industrial experience in bioscience SMEs, candidate quality and the need for greater appreciation of functional skills such as project management, regulatory affairs and quality.

To increase the quality of graduates in the workforce to meet high value added requirements, government should support HEIs in the development of bespoke degrees that emphasise core research, cutting-edge technical skills, industry work placements and business education.

- It is essential to ensure continuing excellence in science education. Increased numbers in higher education must not be at the expense of this. Consequently, BIA Scotland recognises the need for government and academia to consider all options for future funding models to ensure the quality of science education.

²⁰ Dr Tony Bradshaw, bpUK



THEME 6: INCREASING PUBLIC ENGAGEMENT WITH SCIENCE

BIAS would like to make the following comments:

- Trade associations do engage with the public through interaction with the media on relevant issues
- the education agenda for science is fundamentally linked with this theme in that if the first focuses on engaging children and young people throughout the curriculum, then public engagement as a whole should increase in line
- Scotland's Science Centres are rightly seen as a valuable resource for public engagement with science going forward.



- **THEME 7: DEVELOPING BETTER USE OF SCIENCE BY GOVERNMENT**

BIAS would like to make the following comments:

- trade bodies such as BIAS should be engaged as a direct line to industry for input of policy-making ideas. For example, no trade body from any sector representing any facet of industry was included in the stakeholder group for this consultation. Trade bodies will be able to provide most up to date views and perspective of the industry.
- Secondments from industry to the Scottish Executive and vice versa should be encouraged to increase the knowledge transfer between the public and private sectors.