1. **We would like to identify best practice and examples of excellence in business university collaboration in the UK and abroad.**

1.1. Introduction

i - Aston University is located in the West Midlands, which lies at the heart of the United Kingdom and has a population of some 5.3 million people. It is the country's manufacturing and agricultural heartland and the hub of the national transportation network. A region with a proud and unique industrial heritage as the birthplace of the worldwide Industrial Revolution in the 18th century, the region has been, and remains, synonymous with innovation and change.

ii - Historically the urban areas have been internationally famous for manufacturing of a wide variety of products. North Staffordshire is the centre of UK ceramics, Birmingham has long been known as the city of a Thousand Trades, Coventry grew with the cycle, vehicle and aircraft industries and the Black Country towns of Wolverhampton, Walsall and Dudley were the focus of metal production and fabrication.

iii - Restructuring of those industries has reduced the number of people working in the sector, but the West Midlands is still the UK's main manufacturing centre. Manufacturing now produces 30% of the region's GDP and 27% of employees rely of manufacturing for their livelihood although growth in the service sector - particularly retail, distribution, hotel and catering and business services - has been the fastest of any UK region.

iv - Many manufacturing businesses have diversified away from their traditional markets in order to reduce dependence on the automotive sector, but key products are also designed and made in plastics and rubber, electronics and telecommunications, food and drink, jewellery, glass and leather and ICT Software. As with other UK regions business growth has been in the small to medium enterprise sector.

v - Aston has a proud tradition of preparing students for excellent jobs in the real world and has dominated the graduate employment charts for the last decade. As any quality university should, it has an internationally respected research area where leading academics attempt to solve problems faced by industry and commerce in the real world. We provide teaching and research of the highest quality as recognised by independent government assessors. The campus is readily accessible and a pleasant and safe place in which to study and live.

vi - The University is organised into four schools of study, each of which maintains close links with industry, commerce and the public services; these are

a - School of Engineering & Applied Science

b - School of Languages & European Studies

c - Aston Business School

d - School of Life & Health Sciences

vii - The Corporate Triangle element of Aston Business School's vision identifies the corporate relevance of their activities:

a - Research of practical relevance informs excellent teaching and benefits the corporate and wider community.

b - Graduate employability is a measure of the value of programmes to the students and their employers.

c - Corporate involvement in programmes balances students' academic experience and enriches excellent teaching and research."

viii - Extract from the recent EQUIS Report from Aston Business School – "The main features which bring about this strong position [ref corporate relevance] are;

a - Positive encouragement of faculty to carry out research and consultancy with commercial and non-profit organisations and to be active in forming links with the business community.

b - Curriculum design and content that reflects the research, consultancy and corporate links of staff and which includes relevance as one of its main aims.

c - Placement work experience which forms a compulsory part of the degree programme of the majority of ABS undergraduate students.

d - Executive and full time MBA programmes that draw on the work experience of students.

e - Strong links with Aston Science Park, particularly via the Business Partnership Unit (BPU) and burgeoning TCS programmes.

f - Management Development Programme's (MDP) executive education courses and the Management Development Centre that brings many corporate clients physically into the School's Nelson Building."

ix - Undergraduate degree programmes in the School of Life & Health Sciences also emphasise the need for close interaction with companies and organizations in the appropriate fields.

x - The pharmacist needs a broad scientific education and a specialist professional education; we have pioneered an integrated approach to teaching and learning. The degree programme links professional studies to an extensive core science course. The course is also specifically designed to develop learning skills that will prepare students for professional life, including information technology and communication skills.

xi - The final year has the theme of pharmaceutical practice. Study covers the practice of pharmacy in the primary and secondary care sectors with a focus upon the clinical aspects of pharmaceutical care. The final year optional studies module provides a choice from a wide range of subjects. A research project is undertaken in one of the School's research laboratories, in hospital or community practice or in a general medical practice.

xii - Professional education begins in the first term. Students benefit from being taught by practising pharmacists from hospitals, community pharmacies and industry. A feature of the course is that it provides a logical development of key skills that are of direct relevance to the practice of pharmacy. We have close links with local NHS Hospital Trusts and in the final year clinical pharmacy course; there is ward-based teaching in six major, general hospitals. Students have the opportunity to undertake a final-year research project in pharmacy practice and this may be based in either community or hospital practice. We strongly encourage our students to find work in the summer vacation and wherever possible help to find suitable positions.

xiii - Biosciences degrees are flexible allowing a choice between a three-year full-time, and a four-year thick-sandwich programme incorporating a year of relevant professional experience. Professional experience can be gained through the optional sandwich year, with one or more work placements in a professional setting or links with local hospitals which include short-term working attachments for final-year students.

xiv - The high standard of practical tuition and the integration of teaching and research provide an ideal programme for the professional human or applied biologist. Many of our graduates (30%-40%) go on into research. Others enter a wide range of careers in health, welfare, biomedical research and the biological industries. Recent graduates have found positions in research, hospitals, pharmaceutical companies, nutritional and brewing industries, environmental conservation and pollution control, scientific civil service and teaching

xv - The new Aston Academy of Life Sciences provides a platform for the development of patents, license opportunities and new spin-out companies, resulting in income generating opportunities and enhanced employment potential within the West Midlands.

xvi - Pharmacy Expertise includes pharmacy practice, pharmaceutical 'specials' manufacture, methodology of medicines assessment, pharmacoepidemiology and pharmacoeconomics. Aston University has the only pharmacy school in the West Midlands and is one of only 16 in the UK. New state-of-the-art facilities and a wealth of expertise in pharmacy practice ensure the research is leading-edge. Links exist with Janessen-Cilag, Spark, Knoll Ltd, the MRC, Adams Health Care, the Department of Health and Roche. Aston is currently negotiating a synergistic partnership with a multinational pharmaceutical company.

xvii - Commercial exploitation opportunities exist in licensing, drug manufacture and clinical trial design and analysis. Aston University has just commissioned the Aston University Aseptic Unit, for the commercial production (and training in production) of pharmaceutical 'specials'. Opportunities for exploitation are also possible in meta-analyses and systematic overviews, evaluation of clinical trial programmes and statistical design of trials, identification of appropriate outcome measures to be used in particular clinical trials, assessment of the innovative value of new delivery systems, preparation of expert reports to be incorporated in product licence submissions and identification of potential leads for over-the-counter products. Data on the unlicensed uses of licensed drugs is also assimilated and reviewed for possible licensing opportunities.

1.2. Industry's use of the information contained in academic publications, and academia's use of industry patents and prototypes or vice versa.

i - The university is not aware of any "unsolicited" examples of this; however there are examples of this happening where there is some sort of collaborative link with the patent holder. The best examples of this are:

a - An industrial sponsor has contracted for work to be carried out within the University which has lead to a patent which is owned by the Industrial sponsor – the University then continues to work on and develop the subject matter of the patent.

b - An industrial sponsor has contracted with the University for research or development to be carried out and such work has required the University to further develop a patent owned by the industrial sponsor

1.3. Joint ventures between universities and business, for example, personnel exchange or collaborative research and development projects.

i - Aston University has a strong reputation for its applied research. By definition, this requires that the University engages with industry and commerce in order to define its research programmes and achieve successful development and exploitation.

ii - Much of the research work is funded through Research Councils, European Union and regional funding; but there are limited examples of work undertaken that is funded purely by companies. Many of these funded research programmes enable access to and dialogue with key company staff, generally on the technical side, which not only have an input to the research programme itself, but also have a key role in the direction of the programme especially as the outputs get closer to the final stages of development.

iii - The funding contribution from industrial partners is typically obtained in two ways; the company inputs match funding by provision of staff time, access to their facilities, provision of equipment and materials and, only on rare occasions, a cash contribution to project work.

iv - The university has been partners in DTI LINK programmes for some industrially-supported projects. We have undertaken R&D tasks in a range of SMART awards for companies. Increasing use is being made of CASE Awards, which are available through regional schemes administered through the RDAs across the UK and those that are available to new academic members of staff through the Research Councils. Some of these CASE Awards have been precursors to more substantial collaborative programmes such as TCS (e.g. Middlemarch Environmental Ltd – TCS programme no. 4237). Small-scale technical projects are frequently undertaken for West Midlands-based SMEs through our strong association with the regional Manufacturing Advisory Service, which provides funding for short (6 day) academic consultancy projects.

v - Engagement of staff from industry and commerce is generally through their contribution to research programmes. This does not entail specific personnel exchanges, but it frequently generates a close working relationship between the project partners and a constructive dialogue. The University frequently accesses key staff from the business community to deliver specialist lectures on both undergraduate and postgraduate courses, and to deliver keynote, invited lectures within the University's calendar of high profile presentations.

vi - Further engagement with the business community is achieved by the establishment of School Advisory Boards, Quality Review and Industrial Advisory Panels. Senior staff from companies that have an existing association with, or parallel interest and specialism in a School or specific teaching programme are selected to join these groups. They meet at least six monthly to review the operation and strategic direction of School activity and Course programmes. The

feedback from the industrial panel members is relied upon to improve efficiency, quality and content and to guide future strategy development.

vii - Aston University has an excellent track record delivering tangible benefits from TCS and similar programmes, particularly with local SMEs. Examples include

a - The development of an intelligent stock control system with Henlid Ltd, Birmingham

b - he development of processes and improved material characterisation for second use polymer products with Delleve Ltd, Stratford-upon-Avon

c - The development of the next generation of weaving loom technology with Brintons Carpets Ltd, Kidderminster

d - The development of the capability to improve the design of small bore vascular grafts used in heart surgery with Advanced Medical Solutions Ltd, Winsford.

viii - These programmes have involved most areas of the university and in addition to the immediate benefit to company, university and graduate of working on the TCS programme there has been considerable added value through the use of other sorts of collaborative activities such as student placements and undergraduate projects. These provide industrial experience for the individuals concerned and also establish these interactions within the company for future co-operative ventures.

ix - Advantage has also been taken of programmes that receive funding either from the European Union or Regional Development Agencies.

a - KITTS+ was an ERDF (objective 2) funded programme for SMEs enabling shorter collaborations than TCS. A programme with Turnock Ltd that was supervised by Aston Business School addressed the operations of the company and had a significant impact on the business, which lead to it being shortlisted for the Lord Stafford Award for Innovation in 2000.

b - New programmes aimed at graduate placements (KITTS & Graduate Advantage) and collaborations with micro-companies have been launched in 2003. These have been funded by the RDA (Advantage West Midlands) and involve consortia of HEIs in the region, to actively set up co-operative ventures.

x - There are several incentives that persuade companies to work with HEIs through the programmes described above

a - Tangible benefits – the structure of the TCS Grant Application and Proposal Form that requires defined objectives, deliverables and tangible benefits gives the company confidence that working with an HEI will "deliver".

b - Management Structure – gives an element of control to the company over the project, and the inclusion of independent members of the management team (e.g. TCS Consultants) give the companies greater comfort.

c - Funding support – small companies in particular would find it difficult to justify the full cost of some of the programmes described above, and while it is important that the companies do contribute to the costs of a programme to ensure their whole-hearted participation, the financial support through grants help to "sell" the programmes.

xi - Aston Business School (ABS) has the largest placement activity of any academic department in the country. Over 80% of students studying on ABS undergraduate degree programmes undertake a one year placement. This placement year is integrated into the students' academic studies via an analytic placement essay and via final year modules. The Undergraduate Programme Placement Office provides ABS with an on-going connection with major blue-chip companies, smaller businesses, major government departments and partner universities. There is regular contact with around 500 companies and university departments, most of which are leading multinationals. In 2002, 353 students were placed in the UK and abroad. These include 56 of *The Times* Top 100 graduate employers.

xii - In recent years an increasing number of students have taken up work placements abroad, including Holland, Japan and France (see below). Most placements are located in the South East of England, Britain's commercial hub. There were fewer placements in the Midlands and an increased number in the NW and NE of England. A HEFCE funded placement consultant has been employed to promote Aston students for short placements to businesses (especially SMEs) in the West Midlands.

xiii - A website (www.placement.abs.aston@ac.uk) and brochure have been developed in conjunction with the Undergraduate Advisory Panel. These are aimed at companies who are

seeking placement students. Twenty one new company contacts have been made this year through our contacts with alumni, the Business Partnership Unit (BPU) and Management Development Programme (MDP). A website for students (www.abs.aston@ac.uk/ug/placements) has been developed to advertise placement positions. 445 employers placed 712 adverts on the site in 2001/2 and 945 students found their placements using this resource.

xiv - A placement year section has also been developed the on ABS Undergraduate Programme website, aimed at potential students (www.abs.aston@ac.uk/ug). This has a question/answer style and refers students to case studies of students on placements, as well as an impressive list of companies that ABS deals with. The site has been very useful particularly when answering questions from potential overseas students.

xv - Annual in-house surveys reveal that students find their placements especially valuable in improving their personal transferable skills including:

a - Confidence

b - Communication skills

c - IT skills

d - Maturity

e - Insight into business environment

f - Time management and organisation

xvi - Of those students on placement in 2001/2, 28% were offered a job by their employer when they graduated and 12% were offered some sort of sponsorship for their final year. Analysis of employers' assessment forms shows very positive feedback on students' contribution to the company and the ABS placement system. The role of the industrial supervisor in the company should not be underestimated. These people are an important link with the ABS academic supervisor via the student's annual company visit.

xvii - The School of Engineering and Applied Science has a strong commitment to the future. Working with and listening to industry and other close contacts the teaching and research programmes evolve and new programmes come on stream to meet current and future needs. The majority of the degree courses incorporate an optional year-long professional placement in industry research or commerce, and around 70% chose to do a placement year. Specialist placement tutors assist in organising placements, ensure their suitability, and provide the student support throughout the year. There are strong links with an extensive portfolio of companies that are keen to recruit Aston undergraduates and recognise the value of sandwich students in their organisation. Examples of the views of students and companies participating in industrial placements;

a - *Historically AMEC has always had a good relationship with Aston University. The University is sited excellently geographically and the Chemical Engineering course is rated by AMEC as one of the top five in the country. Aston University is considered by AMEC to be in the top five universities for producing the best people for their business."* ROGER PILKINGTON, HEAD OF ENGINEERING, AMEC CAPITAL PROJECTS

b - *"I am currently on my placement year at DEFRA and the majority of my time is relevant to the GIS course. For example, using GIS to locate areas within 10 km of airbases that would attract birds (wet grasslands) so as to minimise birdstrike, and combining Ordnance Survey data with satellite images to inform field officers of site conditions prior to visiting".* CHRIS CAREY, PLACEMENT STUDENT

c - *"I graduated from Aston in 2000 after completing a four-year sandwich programme in Information Technology for Business. What I found most useful about the course was not just the technical grounding it provided, but being able to apply the knowledge in a business. My placement year was invaluable in allowing me to apply the skills I learnt at Aston as well as giving me an edge over other graduates."* WILL HENTON, GRADUATE 2000, EQUANT APPLICATION SERVICES

d - *"Electronics Systems Engineering (ESE) at Aston has a strong reputation and links with industry; throughout my degree lectures were given by experienced professionals in telecommunications. The most rewarding parts of the degree were projects, where we were set a task, budget and deadline – just like the real world"* LEE HORNER, ESE GRADUATE, AT&T GLOBAL NETWORK SERVICES

xviii - Graduate Apprenticeship Scheme

a - The West Midlands Graduate Apprenticeship (GA) scheme is a regional programme, to combine academic study with comprehensive work-based training within a structured framework, to bridge the skills gap between higher education and first employment.

b - In addition to the already established GA in Engineering at Aston formal approval has recently been received for the commencement of a GA programme in IT. This again is a regional programme funded by the Regional Development Agency, Advantage West Midlands. In the near future the following new regional GA schemes are planned:

- Telecommunications
- Polymers
- Construction
- Railway Industries
- Logistics
- Health, Safety & Environment

xix - The GA scheme also offers a development pathway through to professional engineer status and registration with the appropriate institutions. The Institute of Mechanical Engineers (I Mech E) has recently invited the West Midlands GA in Engineering scheme to submit a proposal for accreditation as a matching section allowing GA candidates with a B Eng degree to qualify for C Eng status. Similar discussions are ongoing with the Institute of Electrical Engineers (IEE) and the Institute of Incorporated Engineers (IIE) for mapping GA schemes to the matching section.

xx - Further innovation lies in a completely new Birmingham and Solihull LSC initiative 'Apprenticeships for All' (AFA) – which addresses the issue of skills shortages in engineering by encouraging companies to look internally for sources of talent. AFA offers help and financial assistance to SME companies who wish to further the knowledge, skills and expertise of employees over the age of 25, including employees without any qualifications through to Graduates who may wish to retrain or up-skill. The good news for employers is that they may qualify for financial support for training and employee release costs.

xxi - Birmingham City Council Leader, Cllr Sir Albert Bore, has also agreed to act as a GA ambassador. Cllr Bore, said: *"I am delighted to act as an ambassador for this scheme. The West Midlands has always been at the forefront of industrial technology, and this project will provide the highly trained, educated and motivated men and women that the region's prosperity depends on."*

xxii - If you are interested in getting involved in the GA Scheme we are looking for high quality engineering, IT and Telecommunications companies of any size. We are looking for businesses that value training and invest in the professional development of their staff. If you employ a GA, you will be involved in the training and mentoring aspect of the scheme. In return, we offer bright and enthusiastic candidates who have an equally professional attitude towards their work and professional development.

xxiii - Website: www.aston.ac.uk/gainengineering

1.4. Informal contacts, for example, meetings and conferences, use of science parks, business-university liaison, industry sponsored university posts or studentships, work experience for students, business contributions to curriculum development, academic secondments in industry and provision of continuing professional development training by universities for business.

i - The best examples of this usually come from Companies that are closely allied with the University; this may either be through spinning out of the University or through long-term and ongoing collaborations (e.g., long term research projects). For example, a sponsored research project may lead to an interesting patentable invention. If this is owned by the University this may well then lead to a licence agreement back to the Company for further development. Ownership by the University also means that the University has a vested interest in seeing the technology further developed (not the case if the company takes ownership of the invention when the relationship is then very "arms-length"). Such further development work may well then be carried out by the University (this is especially the case if the licensee is an SME). This leads to more work for the University and so further employment opportunities, the University builds up a body of knowledge on the technology that benefits the company and the Company feeds its knowledge requirements back to the University through research and consultancy.

The closest example to this that I know about at Aston is Indigo Photonics, but this is not ideal since the University assigned technology to the company and so is not getting the full benefit from it.

ii - The University currently has a number of other research agreements with industrial sponsors, but the extent to which these are examples of best practice is debatable since

a - they are one off contracts that do not lead to an ongoing relationship

b - there is the possibility that the contracts were placed with the University as it is thought of as being a way of getting research carried out on the cheap, rather than because the Company has a particular interest in the special expertise of the University

iii - The development of formal collaborative programmes such as TCS is supported by a large number of informal networks in both the business and academic sectors. Local business groups such as the Heartlands Business Forum (based around a development area in Birmingham), the Institute of Asian Businesses or sector oriented groups such as The Birmingham Clothing Sector Forum; offer an opportunity for direct and indirect interaction through a range of routes;

a - Presentations at group meetings or exhibitions

b - Hosting committee meetings

c - Direct presentation of university skills at themed seminars

d - Networking at meetings – either through direct interaction with representatives of individual businesses or through businesses, already involved with universities, acting as champions to others.

iv - Similar access to academic expertise can be made internal through research groups and committees and externally though special interest groups such as TCS Managers that meet on a regional and national basis.

v - Corporate Networks

ABS is extremely active in networking with the corporate world.

a - The CEO Circle, which the Head of School is closely involved in, brings together chief executives of large companies for mutual advice and to share experience. Each circle is chaired by a leading UK businessman.

b - ABS jointly hosts tables with the Business Partnership Unit at a series of corporate dinners. Recent ones have been with the Asian Institute of Business (AIB), CBI, the Birmingham Chamber of Commerce, Business Ethics and Advantage West Midlands.

c - ABS is involved in the two leading business awards in the West Midlands. These are the Birmingham Post Awards which Professor David Bennett and Peter Shearer judge; and the Green Shamrock Awards for which Peter Shearer is also a judge.

d - ABS also offers a prize of MBA fees for the former Award.

e - Another initiative has been the seminar run for the AIB by the Technology and Operations Management Research Group.

vi - TCS

Several recent research contracts are part of a TCS programme, where industry based research projects are jointly funded through TTI Ltd. and the company involved. Coordinated through the University's Business Partnership Unit, this scheme is designed particularly for small or medium sized businesses.

vii - Staff Consultancy

Academic staff are encouraged to undertake consultancy which capitalises on corporate links and enhances their professional expertise including updating and applying their knowledge. All full-time academic staff may undertake up to 50 days a year of external work subject to the approval of the Head of School. So far there has been no reason to reject any request for outside work since this tends to be undertaken by the most energetic contributors to the School. Consultancy can be organised either independently or through the University. Whichever route is taken, consultancy is encouraged by the University, paying the personal indemnity insurance for staff who inform the University of their work.

viii - Typical assignments undertaken include

a - work on privatisation and regulation for the Competition Commission and various overseas countries;

b - work with voluntary sector practitioners;

c - EU work on data protection;

d - client satisfaction measurement implemented by one of the UK main accounting firm;
e - work for regulatory bodies and
f - internet-based factory operations training simulation.

1.5. Formal contracts, for example, the use of licensing, research contracts, consulting projects, establishment of spinout companies, product testing, or business support.

1.6. We would also be interested to learn how the relationship came about. Were your local Regional Development Agency or Sector Skills Council involved? What more could be done to facilitate successful partnerships?

i - Contacts with industry and commerce leading to collaborative working arise from a variety of sources;
a - Development of existing academic contacts;
b - Mail shots targeting particular market sectors that have been identified as matching areas of academic expertise
c - Formal and informal networking (see above)
d - Recommendations from Business Support Organisations such as; Business Link, Manufacturing Advisory Service (West Midlands), CONTACT – an organisation funded through the HEROBaC initiative working with HEIs in the West Midlands Region.
e - Incoming calls from organisations that have picked up information through the university website (www.aston.ac.uk/bpu)

ii - Aston University is the lead organisation for a new regional venture (Graduate Advantage) funded by the local RDA Advantage West Midlands to support graduate retention across the West Midlands. The project is backed by 12 of the 13 HEIs in the region and will provide an online vacancy handling database for local employers seeking to recruit graduates. In addition the project will create and manage graduate and undergraduate placements in local companies to encourage them to consider the benefits that a graduate can bring to their organisation

2. **If you do not have, or would like to strengthen such relationships, what are the main barriers to doing so?**

2.1. Introduction

i - Business can improve its links with HE by being prepared to become more involved with institutions, and thus have opportunities to make clearer their requirements of universities. Some ways of achieving this involvement are as follows:
a - through membership of industrial advisory committees for programme development.
b - through membership of university governing bodies.
c - through being prepared to take students on work experience.
d - through allowing alumni support groups to be developed.

ii - Through these links - in particular membership of university governing bodies and advisory boards/committees - business can help to influence the development of HE, its governance and management; there also needs to be expansion of the links between business organisations - e.g. CBI, Chambers of Commerce - and HE.

iii - In short, only if there is better communication between business and HE, and more involvement between the two, will there be a basis for developing influential relationships, producing the kind of skilled manpower required by business, and facilitating technology transfer etc. as well as improving the management of HE by importing appropriate approaches from business.

iv - Aston University prides itself on its close links with business, industry and the public services. It has established the Business Partnership Unit (BPU) to act as a 'one stop shop' for organisations looking to take advantage of the highly relevant services available at the University. Aston is an applied, business-oriented University, and our strong research and teaching base provides opportunities in a wide range of areas. The Business Partnership Unit offers easy access to academic expertise from any of the University's four schools of study. The Business Partnership Unit was established in Spring 2000, with funding from the Higher Education Funding Council (HEFC) "Reach out to Business and the Community" (HEROBaC) initiative. In 2001 the BPU received an additional £3.5m from the Higher Education Innovation Fund as on-going support for its commercialisation programme. The BPU has established an excellent track record in assisting companies to undertake research. This was achieved by identifying appropriate academic expertise, applying for relevant Government or EU funding,

setting up projects, resolving problems involving intellectual property rights and planning for the commercial exploitation of products.

v - ABS works closely with the BPU to:

a - Develop the School's portfolio of industrial sponsored research (see Appendix 9.13);

b - Engage in the commercialisation of research activity through the registration of patents and licence deals and to support the development of 'spin-out' businesses;

c - Enhance the School's involvement with the government funded TCS programme (formerly the Teaching Company Scheme). Appendix 9.10 lists ABS TCS programmes approved in the last five years. For further details of the TCS see Section 9.5.1;

d - Improve the School's outstanding record of graduate employment through the Work Experience Resource Centre.

vi - The Science Park is part of the Aston Triangle which it shares with Aston University. Established almost 20 years ago, it is the second largest science park in Britain (Cambridge is the largest). It is an extremely successful operation with over 100 companies. Jointly owned by the City of Birmingham and the University, the Science Park is managed by Birmingham Technology Ltd (BTL) whose mission is 'to create wealth and employment in Birmingham by providing facilities for the establishment and rapid growth of knowledge-based companies that can benefit from business support services, management skills and interaction with other companies within Aston's business community'. The Science Park offers companies a link into Aston's research activities. The Business and Innovation Centre provides professional support and facilities to nurture and develop 'start-up' companies, including spin-off companies from Aston's research groups.

vii - In the view of the School of Languages & European Studies one of the major issues in business-university relations arises over the question of what business thinks it should pay for and what it thinks it pays its taxes to have provided. If business wants the quality of graduate recruits which it may find satisfactory - especially people with post-graduate training and research experience- it will either have to pay substantial golden hellos to wipe out debts, or produce on-course sponsorship to ensure debts do not accrue, or raise graduate salaries substantially to persuade people that they will get a return on their investment. For example - why do a PhD in engineering when you could go into a consultancy or a city based finance house and use numerical and analytical skills to pay off debts? But equally, business tends not to realise that the people who have language skills and can pass them on are themselves highly trained professionals. The public sector is among the worst offenders, when invited to go and brief the ingoing British ambassador to Paris neither the institution nor the Aston academic was offered any fee. As is the case with many individuals it appeared that the Foreign & Commonwealth Office thought that the universities were already paid for and hence a free resource. Business does not really recognise that intercultural or area studies research is something that might actually add value to what they do.

viii - It would be very interesting if the enquiry were really to look hard at the balance between arts / humanities / social sciences and science / technology within universities in student numbers, staff numbers, proportion of 5 and 5* departments and consider what the business-university relationship should be for all areas.

a - How should business relate to a philosophy or an English department?

b - What can research in these areas contribute to the economy and who should pay for it?

c - What would we lose if such departments ceased to exist?

d - Can we produce a model for business-university relationships across the board and not just in applied science/technology?

ix - Aston Business School believe the main barrier to business-university collaboration at the moment is the research councils funding scheme which has a bias against business education. This is represented in the relatively small amounts of money that go into business research, with the exception of the current AIM initiative and the representation on the panels which means that the representation of business and management is hugely smaller than the community they represent and that it is impossible for all the functions in business to be represented.

2.2. Management and organisational issues. How can businesses and universities best organise themselves in order to benefit from each other's resources? Do the present mechanisms for priority setting, decision-making and funding in the university sector help or hinder business-university collaboration? What changes might encourage collaboration?

i - For there to be links, as at the ESRC (& Aston Business School), these should be based on the various communities served and the corporate input into that should be greater.

ii - There is a clear danger in excessive meddling in research collaborative strategies to fulfil short term aims and the real role of the university is in developing new ideas. And there is a danger in excessive meddling in little initiatives which distract attention from strategic thinking. In that sense the Research Assessment Exercise support is the most valuable thing of all.

iii - Aston Business School strongly believe that if there is a mechanism to be put in place to increase collaboration it should be simple and based on signalling and incentives. Maybe incentives that reward schools for running programmes that help business or that supplement the income that university partners raise from business. This could be in the form of a tax break. The most disruptive thing of all would be to micro-manage.

iv - Aston Business School support operations like the Business Partnership Unit in Aston which acts as a conduit between academics and corporate departments. This university has made a great contribution towards bringing researchers and business together, both as part of TCS programmes and other national initiatives.

v - The strength of the collaboration depends on a wide range of suppliers being available. In that sense enforced collaborations between institutions such as universities that have the semblance of reaching critical mass should be avoided and funding simplified. All indications are that innovation thrives where interference is minimal and the channels as open as possible.

vi - The definition of "business" should be cast as widely as possible to encompass the public as well as the private sector employers. Local government, the NHS and the armed forces are examples of large scale service "businesses" with an impact on the economy as a whole. It is apparent that extensive funding of developments for the armed forces in the United States, which necessarily involves university collaboration, has over many decades had major civilian spin-offs and commercial application. There is evidence that public service organisations, government agencies and armed services would benefit from the expertise in languages, cultures, lifestyles and attitudes which good academic specialists can provide. The economic benefits may not be very direct, but they certainly exist.

2.3. Technology transfer. What are the barriers? How can it be made more effective?

i - Technologies being developed by Universities are not relevant to industry

a - This requires a clear distinction between work being carried out by Universities in order to further the public knowledge (i.e., research that is “blue sky” and is not intended to have industrial application”), and work that is intended to have an industrial application. Where there is an intended industrial application, discussion should take place early (prior to making grant applications), between University and one or a number of companies that have the potential to take to market any results of the work to discover what courses of research would be most attractive to the industrial sector. This would not necessarily lead to the companies funding or taking options to the technology but would provide more focus and direction.

b - Discussion between industry and the HE sector could also focus on the types of technical problems being faced by industry these may then lead to University research aimed at solving these problems.

ii - University does not have a clear idea of the conditions in industry

a - Industrial sponsors often complain that they need certain provisions in research contracts, licences etc., but do not clearly explain why these are essential to industry, and in fact often they are not. Typical examples of points where conflict arises include confidentiality, ownership of IP, publication rights and so on. If companies were clearer in their explanations of why they required particular provisions this would facilitate agreements that are mutually beneficial. Companies need to be aware that the government is asking Universities to be more commercial and that any provisions that simply appear to the University to be exploitative are not likely to be accepted.

b - Increasing the number of academic staff and students that have some experience of industry would also be of use. University entrepreneurship courses help to some extent but training in business requirements, strategy, competitiveness, etc. for academic staff would also help. This is perhaps particularly true of the research contracts and technology transfer offices of Universities.

c - Perhaps a fellowship scheme that would allow industry executives to spend a year working in Universities would be of help, this already happens to an extent in business schools, but is rare in other departments. Or an encouragement of TCS associates to return to the University when they finish their TCS programme.

d - It might also be possible to establish links with particular companies to allow company staff to advise the University on how it could increase its interaction with Industry.

iii - Business executives do not have scientific and academic experience that would allow them to understand the University view.

a - Increasing the number of business executives that have scientific skills and academia experience would allow businesses to have a better understanding of how Universities operate and why particular requirements that may seem quite reasonable to industry and just not practical within the University setting. There has been some attempt to do this through the Sainsbury Management Fellowship scheme aiming to provide business training to scientists and place them in a business environment – schemes of this nature should be increased. In addition schemes such as TCS are very valuable in this respect although it would be useful if this could be expanded to allow Universities to keep open the positions of academic staff to allow them to take part in the scheme.

b - Perhaps a way of addressing ii and iii would be to have University/Company exchange schemes allowing each to experience the other's environment. These would be especially useful where there are nascent collaborations. Appropriate provisions would have to be made, for example within the RAE to ensure that Universities taking part in such schemes were rewarded rather than penalised.

iv - There is a great deal of suspicion between companies and universities.

a - Greater transparency in the dealings between companies and Universities would aid trust and understanding

v - All Universities do things differently

a - Companies may be deterred from dealing with more than one University to avoid having to figure out a different University system. If Universities could unify they way they deal with companies, at least in some respects companies may be encouraged to expand their dealings with Universities.

vi - No incentive for Universities to work with British companies.

a - When licensing out technologies to companies, the best technologies will usually go to the highest bidder which is often not a UK company. If the government wishes to foster collaboration with UK companies they should provide regulation or incentive that encourages interaction with UK companies.

vii - Universities are not adequately aware of what the research aims of industry are and do not have information on the type of technologies that may be of interest to a particular company.

a - Although there has been some attempt to better publicise the work going on within individual Universities through use of websites etc. it is still very difficult for companies to find out whether a particular University is carrying out research within its area of interest without doing a great deal of trawling or through serendipity. A better approach would be to have a centrally searchable register of the research interests of all Universities throughout the UK (does Universities UK or HEFCE already provide this? If so perhaps it just needs better publicising). This would make it far easier for companies looking to undertake research collaborations to find the most appropriate institution to work with.

b - A similar situation exists in licensing of University technologies. There is no central database of technologies that are available for licensing from UK universities which means that companies must either search individual Universities websites (very time consuming) or the patent databases (does not give you technologies that have been filed within the last 18 months and does not tell you whether a technology is available for licensing). A central database of patents available for licensing would be extremely useful and would save a lot of time and effort. It would also facilitate packaging technologies from different Universities perhaps making the whole more attractive than its parts.

viii - Companies do not clear know what is going on within the University sector.

a - From the other side, if a University has a particular area of research interest or a technology available for licensing within a particular sector it is very difficult to find details on which companies might be interested in collaborating or licensing. A clearer indication from companies as to the areas in which they might be interested in collaborating with

Universities would be extremely useful. Contact in the West Midlands provides some aspects of this but it should be expanded and better publicised.

ix - Companies do not understand the pressures and values of Universities

a - Universities are under pressure to make commercialisation efforts a permanent third leg of funding, there are also limitations placed on the terms under which research can be carried out due to competition and state aid rules. On the other hand many companies see Universities as a way of getting research or technology cheaply. They state that if they need to pay full commercial rates for research (the direction in which Universities are being pushed) then they may as well do it in house. A method needs to be produced under which Universities can charge commercial rates but companies can still benefit, for example a tax break for company research that is carried out in a HEI rather than in house.

2.4. Intellectual property. Are the present arrangements understood and appropriate?

i - Ownership of IP is always an issue in dealing with industry.

a - It is very common in either carrying out industrial research, spinning out companies or even licensing technology for the industrial partner to insist on ownership of intellectual property. It is appropriate for ownership of the IP to remain with the University for two reasons, if University staff have an intellectual input into a piece of intellectual property it is fitting that the University should retain ownership of that piece of IP, if the government is serious about commercialisation activities becoming a permanent third leg of funding, Universities must retain ownership of IP as otherwise its opportunity to commercialise it are seriously restricted. This issue over ownership of IP is not understood by companies and many will go to whatever institution they can find that will allow them ownership of IP. There needs to be a central ruling on how IP generated in Universities will be handled – this will make the process transparent to companies dealing with Universities (and if accompanied by some sort of tax break would not discourage the interaction), it will also level the playing field encouraging companies to go to whichever University is best able to carry out the research rather than to wherever they get it done cheaply with IP ownership. This would mean that Universities themselves are not discouraged from insisting on IP ownership. This could be achieved by having a UK version of the US Bayh-Dole Act (see below).

ii - All Universities do things differently making it difficult for companies to understand procedure.

a - A further problem in the understanding of the arrangements for IP is that all Universities do things differently. A benchmarking exercise identifying best practice in IP ownership and exploitation across UK universities leading to a set of guidelines on University IP ownership and exploitation would be useful.

3. **A third set of questions relates to how business can attract the best graduates and postgraduates with the skills that they require, especially in technology.**

3.1. Introduction

i - In the last year 22 companies gave presentations to second year students who are seeking a placement. Andersen held mock interview sessions, Marks and Spencer, Ford and 3M held workshops on aspects of the application process, all of which were well received by students. In addition, briefing sessions on the placement system, preparing a CV, applications, interview skills and assessment centres were offered in house together with psychometric test practice sessions.

ii - The Undergraduate Programme seeks to foster corporate links in accordance with its mission statement, which is ‘to be, and to be seen to be one of the leading providers of high quality, academically rigorous and vocationally relevant undergraduate management-related degree programme in the UK’.

iii - The ways in which the Programme fosters and develops these links include:

iv - Ensuring that all modules taught on the programme introduce students to theoretical and practical issues which they will encounter in the world of work, both in terms of key skills including IT skills, practical examples and case studies, as well as how these relate to their theoretical studies. Staff and outside speakers are encouraged to present international examples and cases.

a - Encouraging practitioners to come to the University to teach and talk to students in more informal settings. Despite the economic downturn these include:

b - Ford has sponsored the Business Game, in which Year 2 students participate. The Ford corporation is also involved in running the Game

c - Managers from Rover cars visit the University and contribute to the first year module, 'Foundations of Management'

d - Around 30 corporate prizes are awarded annually to students (for example, the Grant Thornton Prize for the best first year student on 'Introduction to Accounting and Finance', The Kraft Food Prize and The Oxford University Press Prize

e - Many final year undergraduate, MSc and MBA projects are carried out in collaboration with corporate sponsors

f - Practitioners lecture on certain specialist modules such as the Legal Research series, Accounting for Management, and Marketing Year 1 modules

g - First Year Foundations of Management lectures have contributions from a head hunter, pharmaceutical companies and also from a member of the Advisory Panel on reflective learning in the context of work experience.

v - Somehow the mismatch between demand and supply has to be tackled. The West Midlands Language skills audit identified language and intercultural understanding skills gaps, but it is known that our students have the skills to get jobs, but it is difficult to attract young people to come onto our courses? It is no good business saying "the universities should put on courses which do ....." if the level of application for those courses is likely to be so low that they will be uneconomic to run. At the CBI lunch the personnel director of IMI was lamenting the absence of technically trained recruits with language skills, Aston had run an M.Eng with language programme, which had been discontinued for lack of applicants.

vi - Most of the questions in the third set on the consultation need to be addressed at school as much as at University level: while students have choices and money follows students the "development of relevant courses" will be a function of student supply and choice, not employer demand.

vii - There is an onus on employers to make the posts where they have skill shortages attractive both financially and in terms of career development before it is viable for the universities to address these issues.

3.2. Is the quality of graduate recruits satisfactory? Are there any obvious gaps in terms of skills and disciplines?

i - Careers Service - The First Destination Statistics obtained by Aston suggests that the quality of our graduates is more than satisfactory, with 79% going into employment straight after their degree. Aston's degree profile is highly vocational, with a strong emphasis on business, IT and subjects allied to medicine.

ii - Businesses are invited to participate in advisory boards to provide input into course development. Many employers take Aston students for an industrial placement as part of their course and this also provides input into course development.

iii - Career paths for science and technology graduates are strong for those wishing to enter industry but routes into academia remain difficult, despite the concordat for contract staff. The lack of security acts as a deterrent and it is still the case that there are many more aspirant academics than permanent jobs.

iv - Careers service staff visit many major employers each year to update information on recruitment plans in these organisations. This is disseminated to students and staff as appropriate. Advisors have formal links with School staff and advisory boards and contribute to TQA visits.

3.3. How do businesses, individually or collectively, communicate their needs for specific scientific or technical skills and for the development of relevant courses in universities?

i - Around 28% of the undergraduate students in Aston Business School are sponsored in their final year, and three-quarters of all part-time MBA students have their fees paid by their employer. In conjunction with the MDP Manager, corporate clients are closely involved in selecting the participants on our MDP (executive) programmes. These courses are tailored to specific corporate needs and are entirely financed by corporate clients. Many MDP participants who successfully complete their modules will progress to the part-time MBA at Aston, thus allowing them to develop their knowledge and skills more fully.

3.4. How could more attractive career paths for science and technology graduates and postgraduates be developed?

3.5. What plans does business have to attract the best talent in the future and are the universities made aware of them? If not, what more could be done to facilitate such a dialogue?

4. **The review team will also want to understand whether financial considerations currently help or hinder the relationships between business and universities.**

4.1. Are there ways in which the present financing arrangements could be made more effective?

i - The budgetary arrangements for TCS as it is currently formulated works well, companies prefer to pay a regular fixed amount for a programme, which can easily be incorporated into their budget and will not present problems with cash flow. Because the costs are fixed, it is easier to make the business case for the programme at an early stage in the development of a proposal. The employment of the TCS Associate by the university has additional benefits for the company in maintaining headcounts and relieving them of HR responsibilities.

4.2. Has the introduction of R&D tax credits influenced business demand for research and skills, and if so, how? Are there other means to the same end?

i - There has been no noticeable change in the attitude and response of industry to R&D following the introduction of Tax Credits. Additional Grant funding to support business engagement in R&D projects is the only means that would attract additional interest. 100% allowances to business partners in research projects for all their additional project costs would be welcome. In-kind contributions via access to equipment and facilities and for company staff time is widely accepted as an equitable means to support some components of research costs.

ii - The R&D Tax credits can be seen as a disincentive to undertake formal collaboration programmes such as TCS. No credit can be claimed on a project that is funded, even in part, by State aid; so if there is a substantial project in place, which utilises company based staff and facilities, there is a reluctance to jeopardize this benefit by taking a TCS programme. Long term this could affect the competitiveness of the business because there would be no economic route for the transfer of technology that may be vital to the development of project as a whole. This has prevented two TCS programmes with very innovative companies that would have made a substantial impact on the development of new products.

5. **A UK Version of the Bayh Dole Act**

5.1. What is the Bayh Dole Act

i - Regulations implementing federal patent and licensing policy regarding “Rights to Inventions Made by Non-profit Organizations and Small Business Firms”.

5.2. What would a UK version of the Bayh Dole Act apply to?

i - The provisions would apply to all inventions conceived or first actually reduced to practice in the performance of a grant from HEFCE, a research council, European Union, Regional Development Agency, Government Agencies, Government Departments and perhaps also Charitable organizations (Funding Agencies). This would be true even if the Funding Agencies are not the sole source of funding for either the conception or the reduction to practice. The provisions would not, however, apply to grants that are primarily for the training of students.

5.3. What would a UK version of the Bayh Dole act look like?

The following would be the major provisions of a UK version of the Bayh Dole Act – these mirror the major provisions of the US Bayh-Dole Act itself.

i - The university would be obligated to have written agreements with its faculty and technical staff [and students] requiring disclosure and assignment of inventions.

ii - The university would have an obligation to disclose each new invention to the Funding Agency within three months after the inventor discloses it in writing to the university. [This could be modified to allow the University to file the application before having to disclose it to the Funding Agency]

iii - The decision whether or not to retain title to the invention would be made within one year after disclosing the invention to the agency, or prior to the one year anniversary of filing the patent if sooner. If the university does not elect to retain title, the agency may take title to the invention.

iv - Upon election of title, the university must file a patent application within one year if it has not done so before disclosing the invention to the agency. The university must, within ten months of the U.K. filing, notify the agency whether it will file foreign patent applications. If the university does not intend to file foreign applications, the agency may then file on its own behalf.

v - Universities must include within the specification of the patent a notification of funding agency support of the invention and funding agency rights in the invention.

vi - If the university elects to retain title, the university must provide the funding agency, through a confirmatory license, a non-exclusive, non-transferable, irrevocable, paid-up licence, the right to practice the invention for academic research purposes in Europe.

vii - The university must submit periodic reports regarding the utilization of the invention as requested by the funding agency, but no more often than annually.

viii - Any company holding an exclusive license to a patent that involves sales of a product in the Europe must substantially manufacture the product in Europe. Waivers of this rule may be granted by the funding agency upon a showing that reasonable but unsuccessful efforts had been made to find a company that would manufacture the product in Europe, or that manufacture in Europe would not be economically feasible.

ix - In their marketing of an invention, universities must give preference to SMEs, provided such firms have the resources and capability for bringing the invention to practical application. However, if a large company has also provided research support that led to the invention, that company may be awarded the license.

x - Universities may not assign their ownership of inventions to third parties, except to patent management organizations.

xi - Universities must share with the inventor(s) a portion of any revenue received from licensing the invention. Any remaining revenue, after expenses, should be used to support scientific research or education.

xii - Under certain circumstances, the government can require the university to grant a license to a third party or the government may take title and grant licenses itself (these are called “march-in rights”). This might occur if the invention was not brought to practical use within a reasonable time, if health or safety issues arise, if public use of the invention was in jeopardy, or if other legal requirements were not satisfied.

5.4. What effect would this have in practice?

i - It would level the playing field – research at any University would be on the same terms – if there was University contribution, University would have to retain ownership

ii - The University could not assign the invention; this would stop any arguments around ownership of IP by either research funders, licensees or spin-out companies. The terms would be well known

iii - The rules would favour SMEs which would benefit the UK economy; it would also ensure that manufacturing was carried out in the UK or Europe also boosting the UK economy.

iv - The rules would encourage third leg funding as Universities would own the IP and would have rights over commercialisation

v - Data would be available centrally on commercialisation efforts to allow the government to monitor the success of third leg activities

vi - Companies would not be able to take unfair advantage of government funded research

vii - The inventors share of revenue will be assured.

Appendix

Contributors to the above report

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