“...increasingly, in this age of globalisation, our national goals are shared international goals, our responsibilities are shared responsibilities, and our opportunities are shared opportunities. And we must not underestimate the good that can be done for the whole world, not least for developing countries, if the relationship between Europe and America is deepened”.

THE CAMBRIDGE-MIT INSTITUTE

The Cambridge-MIT Institute (CMI) is a bold new partnership between two world-class organisations – the University of Cambridge and the Massachusetts Institute of Technology (MIT) – to forge stronger links between academic research and business.

Supported by the UK government, the business community and other partners, CMI is bringing together leading experts in science and technology, entrepreneurs and business leaders. CMI’s goal is to enhance the contribution that pioneering research and teaching excellence makes to economic success, on both sides of the Atlantic.

To this end, CMI is already funding innovative science and technology-based research; acting as the hub of a UK network which links industry with the UK Science Enterprise Centres, and facilitating knowledge transfer through student exchanges and joint initiatives with forward-looking companies. In this way, CMI provides a much-needed forum where the myriad opportunities offered by closer ties between academic research and commerce can be explored and put into action.

Sharing ideas and research methodologies, developing transatlantic teaching resources to produce the next generation of innovators, educating business to adopt new technologies for increased competitiveness, productivity and entrepreneurship. These are just a few of the activities currently being undertaken by the CMI.
Benefiting the Wider Economy

CMI receives a significant injection of UK government funding through the DTI, whose strategy is to support the development and use of science and technology in industry, for the benefit of the UK economy as a whole. CMI is also committed to developing opportunities across the widest possible academic and business spheres, to maximise involvement and spread benefits beyond its two parent universities.

This involves a vast range of activities and existing networks, all supporting the development of new technologies for the growth industries of the future, from genomic research and biotechnology, through to nanotechnology and quantum computing. We want to extend the vision of talented people within science, technology and engineering through improved teaching and research, pulling that research and development through to industry to improve the way companies develop new products, processes, services and markets.

CMI and its Partners

CMI is jointly owned by the two Universities. Among its Board of Directors is Chairman Lord Trotman, who drove the globalisation of Ford, as well as the heads of both MIT and the University of Cambridge. The work of the twin executive directors, one in each country, is also supported by a distinguished Advisory Board.

CMI enjoys the active participation and sponsorship of key business partners, including BP and BT. In addition, CMI has extended its teaching of Professional Practice to BT’s own ‘campus’ at Adastral Park near Ipswich. This reflects CMI’s ethos that any benefits that may accrue at the Cambridge end of the partnership will be rapidly and efficiently disseminated through the UK regions. Indeed, CMI has set up a National Competitiveness Network (NCN) to achieve this end. CMI has also received generous support from The Gatsby Charitable Foundation to develop its activities, in particular in relation to the development of the NCN.

Generating Tomorrow’s Business Leaders

CMI is channelling resources towards training the next generation of innovators and business leaders on both sides of the Atlantic.

The two partners are working together to develop new courses, exchanging undergraduate students for a year of study, and creating integrated research teams where the intervening ocean and time zone differences are but a minor inconvenience.

Research projects are chosen according to their potential connectivity with future business enterprise. There is also a research programme aimed at developing a better understanding of the factors that contribute to competitiveness, productivity and entrepreneurship.

Encouraging Technology Transfer

The entrepreneurship remit of CMI naturally focuses on the interface between university and business, commonly known as ‘Technology Transfer’. Not only will CMI maximise the business impact of its own Integrated Research Programme, but it will also develop innovative new processes to be shared with other UK institutions. In this way, we aim to pull through research work from many universities to deliver the competitive edge of the future.

Looking Ahead

As CMI enters its second year, the biggest challenge is to become a real catalyst for change in the economy. We have set specific programme targets, but ultimately our success will be measured by our achievements in the enhancement of competitiveness, productivity and entrepreneurship, especially in the UK.

We are confident that in CMI we have created a deep and lasting partnership between two world-class Universities that will contribute new talent and new ideas towards the leadership of the global economy in the early decades of the 21st Century.

Under the umbrella organisation of CMI, all these activities are being taken forward by four distinct, yet interrelated programmes. Each Programme is led by two Directors, one from MIT and one from the University of Cambridge.
Integrated Research

We have created joint Cambridge/MIT teams to generate a research portfolio that will underpin those technologies likely to have a direct impact on the future development of the world economy. Research will also focus on issues directly influencing entrepreneurship, competitiveness and productivity.

Undergraduate Education

CMI recognises the important benefits a University can have on the national economy in which it is set, through the quality and leadership skills of its new graduates as they join the business environment with fresh energy and new ideas.

New courses with flexible modules and a programme of undergraduate exchange will ensure that the best of the teaching approaches of MIT and the University of Cambridge are harnessed to maximise this impact.

Professional Practice

This programme initiates a new style of transatlantic teaching for post-graduates and senior business executives. Professional Practice is based on interdisciplinary courses designed to promote cutting-edge practices and an entrepreneurial mind-set to those who drive forward the application of modern technology.

National Competitiveness Network (NCN)

NCN's key role is to promote awareness of all the strands of CMI's activities, from the availability of educational resources, courses and seminars through to the factors that affect competitiveness, productivity and entrepreneurship.

The NCN has already created a cohesive network for the UK Science Enterprise Centres, funded by the DTI, to disseminate and share best practice in enterprise promotion and technology transfer.

This network is broadening to encompass a wider range of government, business community and university participants as the scale of CMI activity expands.
“The UK benefits from having a strong science and engineering base. The Government’s strategy... has been to invest in the science and engineering base to ensure that it is placed to achieve standards of international excellence and maximise its contribution of long-term economic development and the quality of life in the UK. This investment provides access to the global collaboration that is the driving force of scientific advance”.

DTI Science and Innovation Strategy
Research for Future Business

CMI sponsors research in areas of science and technology that are set to have a huge impact on competitiveness, productivity and entrepreneurship in the future. These areas are very diverse and include, among others, genomics, nanotechnology, quantum computing, space technology, biotechnology, e-sciences and green technologies.

To achieve this, CMI brings together specialists from MIT and the University of Cambridge to work on joint research projects, combining some of the very best minds from these two centres of research excellence.

Developing an Enterprise Culture

Research projects are commissioned and coordinated by the CMI Integrated Research (IR) Programme, which is responsible for choosing appropriate projects, exploring issues of entrepreneurship and bringing about cultural change through people exchanges between MIT and the University of Cambridge.

The IR programme works closely with industry to identify areas that would benefit most from investment in research. Decisions are made via a rigorous review process of joint proposals received from expert teams at MIT and Cambridge. The process is highly competitive and only a small number of the very best submissions receive funding.

Several areas of research have been identified both by academic experts and major UK industries as being of the most significance for the economy. Development of technologies for future application is key to the Integrated Research programme. Some of the main areas in which CMI is involved, are outlined in the following text.

Post-Genomics Technologies for Pharmaceuticals

CMI has initiated joint research into the manufacture of an improved drug to treat AIDS. The aim is to eliminate some of the side effects currently experienced with the existing treatment and increase its effectiveness and safety through research based on highly efficient rhodococcal cell factories. (The photographs above illustrate the Rhodococcus cells genetically engineered to emit light (left) and a rhodococcal cell factory (above)).

Researchers will combine state-of-the-art genetic approaches, genomics, and DNA analysis to investigate metabolic engineering of Rhodococcus and its potential as a production platform for a more effective anti-AIDS drug.

The metabolic pathways involved in these drugs will be investigated, and production bottlenecks avoided using genetic engineering and other novel approaches, leading to the more effective production of better drugs.
Innovative IT Technologies

One of the most pressing problems facing modern organisations is how to ensure the security of electronic data transmission, for example, between banks or in credit card transactions over the web. Security problems are compounded by increasing web traffic, e-mails and large-scale data transmissions which are outstripping the system’s ability to cope. Indeed, hackers have seized on this weakness to launch ‘denial of service attacks’ where servers are deliberately overloaded.

The US and the UK have embarked on research into GRID technology to address these problems, with the University of Cambridge being one regional centre for GRID research. GRID stands for the next generation of the world wide web, as its current technology-base will become obsolete due to overloading. CMI is supporting a related joint research effort into quantum computation that is likely to lead to novel ways of transmitting large data sets securely. The project has already attracted significant private funding and is expanding rapidly.

CMI is also supporting parallel research into advanced electronic storage that provides increased memory capabilities. A joint project, which has attracted support from Japanese and private US sponsors, focuses on the use of ferroelectric thin films as active memories. These could be used in swipe cards, for example, or, according to some analysts, as high-density memories in a large-scale GRID environment.

“The UK needs to maintain its world lead in the fields where it is strongest and develop a lead in new areas, while maintaining the capacity to do science which is recognisably world class across the board”.

DTI Science and Innovation Strategy
The UK itself is highly dependent on hydrocarbon resources, with oil companies such as BP being the largest industrial players in the market. An integrated energy policy requires detailed knowledge of the environmental impact of both traditional and so-called ‘e’ green energy sources, which is why CMI supports ground-breaking research in this area.

CMI has invested, for example, in research into the reduction of carbon dioxide in the atmosphere. If removal of this key greenhouse gas were to succeed, significant amounts could be soaked up by the ocean or disposed of in other ways. Two leading research teams at MIT and Cambridge are currently investigating ways to increase the absorbency of CO2 in the ocean. This is clearly a high-risk project, but has the potential to have an historic impact on energy production on a global scale.

The last ten years have seen enormous changes in the structure of the electricity markets in North America and Europe. Monopoly electricity companies have been broken up and competitive markets for the generation, transmission and supply of electricity have been created. CMI is funding studies into some of the key issues that have emerged from the process, looking at what types of restructuring are best for productivity and the environment, and whether the introduction of competition requires special measures to promote innovative developments. How electricity transmission rights should be priced with the presence of so many generators and limited transmission capacity is also a key issue for research.

Other CMI research includes a major study on energy saving in buildings being fully funded by BP; a nuclear energy project; examining novel methods for finding oil; and researching the distribution of harmful gases in the urban environment.
**Applying Novel Materials**

Materials experts in both the US and the UK predict a return to the use of metals and an increased use of polymers in the future, with a corresponding decline in the use of ceramics.

Improving metals and polymers is therefore a priority and is accordingly at the centre of CMI’s research programme on materials. CMI is funding pinpointed joint research projects on each of these materials. The first is concentrating on weight-reduction through the development of ultralight metals for the motor and aviation industries.

The second project is focusing on hard polymers based on carbon-nanotubes, which have been identified as having the greatest potential for enlarging the range of applications of polymers, replacing traditional ceramics in the production, for example, of car parts or chemicals.

**Research for Our Future**

CMI is co-ordinating and sponsoring some the most exciting and influential research projects in the world today, combining the expertise and talent of both Universities and sharing ideas with stakeholders in the wider academic and business communities of each nation. In this way, CMI and its partners are setting out to solve some of the most important science and technology-based challenges that lie ahead, and translate those research findings into business innovation.
“Government should seek to increase significantly the cadre of top class, technologically sophisticated people in the labour force. In partnership with universities, Research Councils, the professional institutions and businesses, it should promote a greater two way flow of senior technologists between companies and universities; and seek to improve career pathways for students and researchers in science, engineering and technology, so that they gain the skills, knowledge and contacts needed for running technology based businesses”.

Best of Both Worlds

The purpose of the CMI Undergraduate Education (UE) Programme is to combine the best of what the University of Cambridge and MIT offer in the way of undergraduate education, engaging both students and specialists from each organisation in each other’s work and achievements.

The aim is nothing less than a significant cultural change through the sharing of ideas, teaching approaches and learning materials. The overarching aim is to inject innovation and a spirit of enterprise into research for future competitiveness and productivity in the business world.

The UE programme will produce an enduring alliance between the two organisations that will benefit students and ultimately both economies.

To achieve this goal, the CMI UE programme is pursuing a strategy based on a continuing high level of engagement between Faculties in related departments at the two institutions. Therefore, the components of the programme are:

- Undergraduate student exchange.
- Use of new information and communication technologies.
- On-going evaluation of all activities, from new course developments through to IT based teaching methods to ensure the effectiveness of initiatives.

Through its impact on Cambridge and MIT undergraduates, and via the dissemination to other UK Universities of the materials and expertise it will produce, this programme offers the widest possible benefits to research in many other organisations that want to get involved.

Undergraduate Student Exchange

The best way to get an MIT effect on Cambridge students and a Cambridge effect on those from MIT, is to send them to the other institution. This began in 2000/01 with a pilot exchange involving nine students from MIT spending part or all of the academic year taking courses in the Cambridge departments of Engineering, Chemical Engineering and Materials Science. All indications are that this pilot was a success for the students, both personally and educationally.

In 2001/02, over 30 Cambridge students will be taking courses in various MIT departments of Engineering including Aeronautical and Astronautical, Chemical, Civil, Electrical, and Mechanical, as well as the Departments of Materials Science, Mathematics, and Physics. Similarly 27 MIT students will be in Cambridge studying in the corresponding departments.

In 2002/03 and beyond, an increasing number of departments from across the full range of academic subjects will participate in the exchange. The CMI target for each succeeding year is set at 50 students going in each direction, but the number is only limited by the funding available to cover the additional out of pocket expenses which each student incurs. Currently, support comes from a number of private sources and an essential element of the development of the exchange will be further fund-raising.
A key feature of the exchange involves specialists in participating Departments achieving an understanding of which courses their students should be taking while studying at the other University. Historically, both MIT and Cambridge have found it difficult to organise a full year of study abroad for their students, without severely interrupting their progression towards the end of their degrees. The present scheme avoids these problems by giving students a full year’s honours credit (or equivalent) while abroad.

Apart from the full year exchange, CMI is developing a shared version of the MIT Undergraduate Research Opportunities Programme (UROP). UROP has been a successful and important innovation at MIT in the past three decades, and the past summer has seen a pilot programme which has taken four students from Cambridge to Boston. In a UROP placement, an undergraduate student works as a member of a research team involved in an ongoing project. He or she is given a large amount of responsibility for his/her part of the project and is expected to contribute as any other member of the team would. This gives undergraduates direct experience at the cutting edge of research, and it transforms their relationship to their academic subjects. Four Cambridge students, three in Materials Science and one in Neuroscience, spent extended periods in laboratories at MIT in 2001, and they have been extremely successful, with two gaining publications from their time there.

In summer 2002, a full programme of UROP exchanges with students going from Cambridge to MIT and vice-versa is planned. Each student will work with a principal investigator in the host institution, and will be guided in their preparation prior to their departure by a sponsor in their home department.

For the future, an extension of the UROP programme is being considered which would involve students taking similarly focussed internships in companies in the Boston and Cambridge areas.

“Being at Cambridge was part absorbing this tradition, part studying as a third-year engineer and part participating in the flurry of student activities. I have countless memories: studying for exams, playing in music societies, but what I miss the most is hanging out with my British friends, especially the late night conversations over cups of tea.

I’ve learned first hand that education goes beyond academics. Also, I’ve learned that life is too short to be complacent. An opportunity like this comes only once, and had I not gone, I wouldn’t have known what I missed. Taking this chance was one of the best decisions I’ve ever made”.

Gina Kim, CMI exchange student
Developing New Courses

Both MIT and Cambridge have a variety of strengths in their undergraduate courses. These strengths will be enhanced through the process of transferring materials and competencies from one to the other, and the establishment of new courses to be taken at both. Numerous options are under discussion at the moment including:

- Funding for the development within the University of Cambridge Engineering Department of courses on Micro-Electro Mechanical Systems (MEMS) mirroring those taken at MIT. This is linked to an Integrated Research grant to the Department, and represents a valuable co-ordination of the IR and UE programmes.

- Funding for staging a course module on Biomaterials Engineering to be taught at Cambridge in autumn 2001.

- Funding for a joint design studio for students in the Cambridge Departments of Land Economy and Architecture, and the corresponding MIT Departments of Urban Design and Architecture. This will involve students from both institutions working together on design briefs for urban and industrial development which links environmental, economic, legal and architectural concerns, and pays special attention to how urban design can facilitate economic growth.

- Funding for the development of a computer-based course on the analysis of literary materials and the construction of multimedia narratives. This will initially use Shakespearean materials and will allow students to work simultaneously with a wide variety of representations of the same text (different folio editions, graphic representations, films and audio), and to create accounts that weave these basic materials together into multimedia hypertext essays. This will provide students in the Arts and Humanities with skills and abilities in an area of creative activity that is very important to modern communications and economies.

- Funding for the development within MIT of student support and tutoring practices based on the Cambridge model.

“We were welcomed by CMI administrators and academic members of MIT. Our hosts from MIT were mostly high-ranking members of the Institute. Their attendance made me realise how prestigious this programme is, which made me feel both proud and responsible at the same time.

I have had a very enjoyable stay in MIT and US so far and I look forward to the rest of this year with excitement”.

Maral Shamloo, CMI exchange student
Teaching Entrepreneurship

An important element of the UE programme is the introduction of a more entrepreneurial approach to the general culture of the undergraduate programme in Cambridge. An important element of this will be the introduction of more explicit entrepreneurship education into the curriculum. The courses involved will be widely available to students throughout the University no matter what subject they are taking. Initially, there will be a special emphasis on courses in entrepreneurship and technology management for the more technologically focused degree courses within the University.

This part of the Undergraduate programme will be conducted in conjunction with the NCN programme, and an NCN entrepreneurship curriculum advisory group has already been formed. The existing Cambridge Entrepreneurship Centre has already made a number of important contributions in this area, and CMI is building a collaboration with it for further provision.

Information Communications Technology

CMI has a commitment to researching and developing the use of various remote collaboration technologies, and information communications technology based systems for the delivery of new course materials. Both Cambridge and MIT have important strengths in these areas already with individual departments and units such as CARET (Centre for Applied Research in Educational Technology) in Cambridge and CECI (Centre for Educational Computing Initiatives) in MIT. The focus within the UE programme is on the following issues:

• The creation of open source software for educational platform development under the Open Knowledge Initiative (OKI). Cambridge is the only non-US participant in OKI to date, and through this will be able to take an important role in setting software standards.

• Remote collaboration using video and other technologies has always seemed to hold tremendous promise, but realising this promise has proved extremely difficult. Through the engagement of BTexact with CMI, the UE programme is able to support a line of research into the structuring and use of these technologies in the educational environment. The lessons learnt about effective remote collaboration will almost certainly have much wider application in education and business.

A Shared Vision and Approach

The UE programme is committed to the highest level of engagement between Faculty and students at the two institutions. The resulting cultural exchange and the developments it will bring about should not only benefit the two organisations involved, but will also enable the innovators and business leaders of the future to work towards a shared vision of learning, research and applications to the world in which we live.

“Lectures are very different from those in Cambridge... and the grading system is very different too: for all but one of my subjects this semester, there are no final exams! This means of course that you have to work hard throughout because your problem sets are graded.

There is also the Undergraduate Research Opportunities Programme (UROP), for those interested in experiencing research. I am taking a UROP in micro-combustors.

Do I feel that I made the right decision in coming here? Absolutely!”.

Tan Khoon Tee, CMI exchange student
“The science and engineering base has a key contribution to make to the UK economy and way of life through its generation of new ideas and techniques, and the development of skilled people”.

*DTI Science and Innovation Strategy*
Looking at the Bigger Picture

Better research and better education means better business. Postgraduate and continuing professional education is a key channel for transferring knowledge and developing the skills required to improve entrepreneurship, competitiveness and productivity in the UK.

The Professional Practice Programme (PPP) is charged with developing these areas for CMI to provide a much more holistic approach to education, research and its relation to successful industry and enterprise.

The term Professional Practice is new to the University of Cambridge, where postgraduate education, leading to MPhil and PhD degrees, is traditionally academic rather than vocational. By contrast, professional practice education at MIT has a much wider remit. It is more directly orientated towards the provision of practical skills relevant to industry. It delivers lectures, seminars and short courses for practitioners and business leaders, as well as entire degree programmes for full time university students. Professional practice at MIT is also usually interdisciplinary, combining technical material with curriculum in areas such as management, entrepreneurship and policy.

Improving Business Practice

The Professional Practice Programme is the focus of CMI’s broader engagement with industry, to improve business practice and encourage the application of new technologies for the mutual benefit of continuing research and a more competitive economy.

PPP brings together specialists from the University of Cambridge and MIT, including experts from differing disciplines who may never have worked together before.

The programme features three core elements: the provision of degree programmes; short courses often relating to specific industry sectors; and a distinguished lecture series for senior business leaders and experts in the fields of science, technology engineering and other relevant disciplines.
More Synergy with Enterprise

The Professional Practice Programme is developing an exciting portfolio of new Master’s degrees that place increased emphasis on practical applications, case studies and keeping pace with developments in industry.

Four of these degrees have already been commissioned and should be fully established by the 2002-2003 academic year. These programmes will be unique in several respects, in that they will:

• Combine science or engineering disciplinary bases with courses on business and entrepreneurship. MIT has an excellent track record in this respect, and the ability to combine disciplines is widely regarded as a major explanation of the success of MIT’s spin out activities. All of the new Master programmes will share this unique approach.

• Feature modular structures that will allow individual courses on each programme to be included in other, sometimes pre-existing, programmes. This is a considerable innovation at Cambridge, where Master’s degrees have typically comprised courses highly specific to those programmes. A more multi-disciplinary approach promises significant economies of scale but more importantly, will bring together groups of students from different disciplines who would not otherwise meet and work together.

• Be developed and delivered by Faculty members from both Universities. One of the most exciting aspects of the CMI PPP programmes and modules is that MIT and the University of Cambridge specialists will in some cases contribute directly to the teaching on either side of Atlantic, both face to face and via video-conferencing and alternative digital media.

“The total value added of the products and services created and produced in the UK, as well as the efficiency of their production from human, capital and other resources will determine the nation’s productivity, and in turn it’s prosperity. This will hinge upon the investment of research and development and technological innovation; a skilled technically competent work force; and a modern technology infrastructure”.

New Master’s Degrees

The four degree programmes currently under development are:

**Advanced Chemical Engineering Practice**
This is a one-year Master’s degree programme at MIT that has been offered successfully in the United States for 30 years. The CMI version of this programme will follow the MIT model, with students from industry mixing on-campus courses with studies while working in industry. This programme will involve Cambridge students spending a semester at MIT.

**Bioscience Enterprise**
This degree adapts a new programme currently being piloted at MIT, combining courses in both Health Sciences and Technology, and Management of Technology at the Sloan School. The CMI programme will enjoy special synergy because the University of Cambridge brings an elite medical school into the organisational planning that will add to MIT’s own programme, while MIT has one of the world’s leading bio-materials groups. Students will have access to a wide range of science courses across the School of Biological Sciences at the University of Cambridge, as well as to courses on business and entrepreneurship given at the Judge Institute of Management and the Cambridge Entrepreneurship Centre.

**Technology and Public Policy (TPP)**
At MIT the TPP attracts a high proportion of science and engineering students interested in bringing technical skills to bear on policy issues facing government and industry. The CMI TPP, like its MIT counterpart, will allow students to combine technical engineering subjects with technology policy, risk assessment and economics. CMI has funded work on a set of modules that is already being offered to students in various MPhil programmes at Cambridge. These modules will go on to form part of a stand-alone programme on Technology Policy, scheduled to start in the 2002-2003 academic year.

**Environmental Engineering and Sustainable Development**
The increasing importance of sustainable development for infrastructures and in engineering is the driving force behind this course. Industry is responding to government initiatives and new legislation, but the degree of innovation required to meet the demands of sustainable development is outstripping the ability of industry to cope. The underlying objective of the programme is to facilitate, through taught modules and a dissertation based on research, an increased understanding of sustainable development among engineers and associated professions, so they can apply best practice and innovation to their own professional practice, whether in industry, government or academia.
Sector Specific Events

The series of short courses to industry and business will kick off on 17 December 2001, the first course “Innovation and its Regulation in the Pharmaceutical and Biotechnology Industries” delivered in conjunction with the Programme on the Pharmaceutical Industry (POPI), will address key issues within the industry.

- What does the future hold for the Pharmaceutical and Biotechnology industries?
- What new areas will provide the new drug and treatment platforms that will be the block-busters of the future?
- How will regulation and cost-control by national approval bodies affect the economics of drug development?

These are just some of the questions that will be tackled by practitioners and expert commentators in the industry.

Keynote speakers will include senior specialists from MIT and the University of Cambridge as well as top industry figures. Specific topics to be covered include the role of technological innovation in the future of pharmaceutical development; image informatics in pharmaceutical discovery; chemical and biological microsystems for discovery and process development; and the types of data required to meet marketplace demands.

Specific Modules Go Live

These programmes will all be on stream by the 2002-2003 academic year. However, a number of freestanding CMI Master’s-level modules are already being offered in the current academic year, all developed and delivered by teams drawn from MIT and Cambridge. These modules cover the following topics:

- Political Economy of Technology Policy
- Risk Management and Real Options
- Distribution Networks: Economics
- Market Structure and Strategies
- Institutions of the Modern Corporation
- Biomedical Enterprise

We have also commissioned a Lifelong Learning Programme on Managing Change and Innovation in Work, which will be disseminated in digital form.

Short Courses and Executive Education

The Professional Practice Programme will also be offering a series of short courses to industry and business, offered jointly by specialists from MIT and Cambridge. The short course series will run to at least six offerings in its first year, including courses on Internet-based supply chain management, manufacturing, bio-informatics and disruptive technologies.

These CMI courses will create yet another channel for knowledge transfer, to maximise the contribution of education and research to economic development and the quality of life.

Distinguished Lecture Series

To encourage debate, share information and foster an enterprise culture among innovators and business, CMI will offer a series of world class lectures to over 30 British universities and an international community of corporations. Facilities have been completed to give CMI an independent capability to receive and transmit programmes and lectures, including a lecture theatre at the Judge Institute of Management at the University of Cambridge and an interactive classroom at MIT. As with the rest of the Professional Practice Programme, these lectures will focus on contemporary issues and leading edge thinking in the broad domains of management, science and technology. Eight lectures are planned in 2001–2002.

Business Partnerships

Finally, the Professional Practice Programme will deliver educational programmes to BTexact and its partners at its multi-company ‘campus’ at Adastral Park near Ipswich. Launched in May 2001, BTexact Technologies develops advanced communication technologies for companies worldwide. This is the first of what we hope will be many such partnerships between CMI and UK industry.
A Unique Forum for Sharing Information

The National Competitiveness Network (NCN) plays a central role in communicating and promoting the work carried out by CMI's three other programmes through a variety of channels including conferences, seminars and workshops.

The network encompasses the wider community of universities and businesses in the UK, providing a unique forum where ideas can be exchanged, findings can be shared, and issues relating to productivity, competitiveness and entrepreneurship can be explored in depth. In this way, the NCN offers the benefits of CMI's joint venture to a broader community of universities and the commercial sector, by developing links and facilitating the flow of information.

Translating Research Into Competitive Edge

The UK government recognises that universities are key to creating a competitive, knowledge-based economy through research and their approach to educating tomorrow's business leaders and innovators. Excellence in research and the promotion of teaching at the highest levels must be combined with the will and ability to convert science and technology into commercial enterprise. Sharing best practice and collaborative work across institutions, academia and the business world is the most competitive way forward.

The challenge for the National Competitiveness Network is to promote this vision, foster joint teaching and research projects, and create a culture of innovation and enterprise.

Benefiting a Wider Community

NCN's mission is to deliver a national programme of activities to promote competitiveness and entrepreneurship in the UK. In doing this, NCN embodies the two key watchwords of UK science and innovation policy for the 21st Century: excellence and opportunity.

Excellence and best practice in the promotion of entrepreneurship, productivity and competitiveness will flow from the work of the CMI programmes in Integrated Research, Undergraduate Education and Professional Practice. At the same time, the opportunity to work with, and to learn from CMI in these areas will be afforded to other universities and industry by the activities of NCN.

NCN is creating an infrastructure through which research findings, curricula and emerging best practice in the promotion of entrepreneurship, innovation, and technology transfer can be disseminated as widely as possible in the UK. It will also promote a wide-ranging series of debates about the effectiveness of industrial, fiscal, educational, and science policy in the drive to create an enterprise culture.

An annual National Competitiveness Summit organised by NCN will also provide an opportunity for industry, universities and government to debate UK progress in technological innovation, competitiveness, productivity and entrepreneurship.
“Collaboration between higher education institutes and business is... a priority, to ensure that scientific advances are fully exploited... there is a strong emphasis on the importance of science, engineering and technology to regional growth and on ensuring that the framework is in place for scientists and businesses to make international links”.

DTI Science and Innovation Strategy
Working with Science Enterprise Centres

A central plank of the government’s strategy on innovation and entrepreneurship is the creation of twelve Science Enterprise Centres (SECs) to sponsor commercialisation of science and technology. NCN has provided these centres with an initial programme of quarterly meetings, bringing to the UK leading-edge presentations from key MIT staff on issues of shared priority. This has been combined with presentations from UK partner universities on current UK best practice. These meetings, developed in consultation with the Science Enterprise Centres, have provided the opportunity to debate MIT practice and the lessons to be learned in creating appropriate structures and policies for the differing regional economies in which each of the UK centres operate.

Enterprising Debate: Sheffield

The effective management of intellectual property has become a major concern of government in the UK, with a high priority placed on improving public sector awareness of best practice in this area. Accordingly at the inaugural NCN/SEC meeting at the White Rose Centre for Enterprise at Sheffield, Lita Nelson (Director, MIT Licensing Office) and Karen Hershey (Senior Counsel for Intellectual Property, MIT) outlined key elements of the MIT policy on intellectual property, sponsored research and spin outs. These were compared with practice in the UK at Cambridge and Glasgow in specific presentations, and with practice in other institutions in a lively debate from the floor.

Promoting Enterprise Culture: Nottingham

A further concern of policy has been the promotion of an entrepreneurial culture among students, and the importance of careers spanning both university and industry environments.

This provided the topic for the second major NCN workshop for SECs held at the University of Nottingham Institute for Enterprise and Innovation. In addition to SEC members representing over thirty UK universities, participants included the Research Councils, the Open University and the Universities of London, Liverpool and Aberdeen.

During the workshop, MIT explained the methodology it uses to run a student-led $50k business plan competition in which a working laboratory is created for students to develop a viable company. There was considerable discussion of the entrepreneurial energy released by having students run this competition and of the coordination of the business plan process with academic courses led by MIT staff to back it up.

The NCN/SEC partnership has formed a group to develop joint undergraduate curricula in entrepreneurship, linking CMI work in this area with expertise in the individual SECs. The outcomes will shape the programme of workshops for next year with meetings planned in Warwick, Durham, Glasgow and Belfast.
Business Plan Event: London

The MIT and Cambridge Entrepreneurship Centres held a major business plan event at the Natural History Museum in London, which attracted substantial sponsorship.

The event celebrated the entrepreneurial initiative of winning students from both MIT and Cambridge in their respective business plan competitions.

More importantly, the event provided the winners with a platform for elevator pitch one-minute presentations about their proposed start-ups. Around 500 participants from venture capital firms, high technology corporations, the UK SECS, and CMI attended the event, to network and strengthen the community ties which are often the key to launching new ventures.

E-based Learning: Warwick

The SEC workshop at the The Mercia Institute of Enterprise at the University of Warwick – December 2001 – will tackle key issues surrounding intellectual property management, with a particular focus on the copyright issues associated with e-based and distance learning. This topic is central to the effective development of CMI and other university consortia that seek to jointly develop and disseminate e-based learning materials. The developers of the ground-breaking MIT Open Course Ware initiative will outline the strategy associated with its development and lead a discussion on the role of residential research universities in an age of ubiquitous communication. This will be set against a detailed assessment of the current legal position on copyright in the UK by the Patent Office, and of issues of practice and management in distance learning by the Open University.

“We need to raise growth, raise living standards further and begin to close the productivity gap with our international competitors. We must build on the foundations already laid to spread prosperity to all our region. The government cannot do this alone. Employers must recognize their competitive position increasingly rests on how they develop and use skills of all their people. Businesses must invest in new products, seek out new markets and develop new partnerships”.

**DTI, White Paper, Opportunity for all in a world of change.**
Through the work of its four programmes, CMI is set to achieve a continued broadening of involvement to encompass industry, regional policy bodies and an ever-increasing number of universities.

We welcome the involvement of all those interested in working with CMI to achieve its aim of helping UK business match the world’s best.

“We are optimistic about the UK’s prospect: the UK economy has many strengths. But future prosperity will hinge upon the growth and success of companies which invest in the creation and application of technology in new products, processes and services. These technology based businesses will become increasingly important to the nation’s share of the wealth that is created and consumed in the global economy of the 21st Century”.

Board of Directors

Sir Alec Broers  
Non-Executive Director, Cambridge

Mrs Sharon Carroll  
Acting Company Secretary, Cambridge

Professor Phillip L Clay  
Non-Executive Director, MIT

Mr Jon Guncliffe  
Observer, Managing Director for Finance, Regulation and Industry, HM Treasury

Professor David Newland  
Non-Executive Director, Cambridge

Dr John M Taylor  
Observer, Director General of the Research Councils, Office of Science and Technology

Lord Trotman of Osmotherley  
Chairman

Professor John Vander Sande  
Executive Director, MIT

Dr Charles Vest  
Non-Executive Director, MIT

Professor Alan Windle  
Executive Director, Cambridge

Advisory Board

Professor Neil Alford  
The Gatsby Charitable Foundation

Mr Nick Butler  
BP plc

Mr Alex D’Arbeloff  
MIT

Dr Gordon Edge  
Scientific Generics

Mr William Hambrecht  
WR Hambrecht & Company

Professor Pat Hughes  
BT Adastral Park

Dr Chris Henshall  
Office of Science and Technology

Mr Michael Hipkins  
Department for Education and Employment

Mr Tony Meggs  
BP plc

Lord Oxburgh  
University of Cambridge

Sir Peter Williams  
University of Oxford

Programme, Assistant and Associate Directors

Mrs Margaret Enders  
Associate Programme Director, Undergraduate Education, MIT

Dr David Good  
Programme Director, Undergraduate Education, Cambridge

Professor Alan Hughes  
Programme Director, National Competitiveness Network, Cambridge

Mr Michael Kitson  
Associate Programme Director, National Competitiveness Network, Cambridge

Dr Kirk Kolenbrander  
Associate Programme Director, Undergraduate Education, MIT

Professor David Litster  
Programme Director, Integrated Research, MIT

Dr William A Lucas  
Associate Director, MIT

Professor Nick Oliver  
Programme Director, Professional Practice Programme, Cambridge

Professor Bob Redwine  
Programme Director, Undergraduate Education, MIT

Ms Renee Robins  
Associate Programme Director, Professional Practice Programme, MIT

Professor Pat Hughes  
BT Adastral Park

Dr Chris Henshall  
Office of Science and Technology

Mr Michael Hipkins  
Department for Education and Employment

Mr Tony Meggs  
BP plc

Lord Oxburgh  
University of Cambridge

Sir Peter Williams  
University of Oxford

Photographic acknowledgments: Donna Coveney, Gair Fraser, David Good, Perry Hastings, Nicholas Jacoby, Philip Mynott, Bruce Robertson, Jean Teall, Laura Wulf.