Cambridge-MIT Institute



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Preface

Cambridge-MIT Institute (CMI) is a pioneering partnership between Cambridge University and the Massachusetts Institute of Technology (MIT). It was set up in June 2000 to enhance the competitiveness, productivity and entrepreneurship of the UK economy. In committing funding of up to £68 million, the Treasury made it clear that CMI's task was to "think the unthinkable" in generating ideas for applying scientific research to business and industry in ways that might have substantial economic benefits to the UK over the long term.

This report is in response to a request from the Committee of Public Accounts that we investigate CMI. We examine how CMI was set up; CMI's current and likely achievements; and the role of the Department of Trade and Industry (the Department) in monitoring the progress and management of CMI's programme. We set our findings in the context of the challenge presented by public sector investment in an experimental initiative which, by its nature, will have outcomes that cannot be confidently predicted. In these circumstances, the goal for the public sector is to define appropriate levels of controls and risk management that are consistent with innovation. The Treasury and the Department were right not to try to follow the usual arrangements for setting up initiatives, but aspects of CMI's establishment could have been managed better. Very ambitious expectations for the first two years added to the difficulty of getting a true picture of whether the progress being made was reasonable. Over the course of the initiative, the management within CMI has developed to become more systematic.

Many of CMI's key outcomes are complex and intrinsically difficult to measure, and will not be realised for some time, though there have been some early successes. One of our aims in undertaking this study was to draw the lessons from the CMI experience for others in the public sector who have to manage innovative projects and initiatives. These lessons need to be applied and adjusted intelligently to match the requirements of each project, and we therefore make no specific recommendations. Instead on page 11 we provide a questionnaire for departments to use as a guide when considering funding innovative projects. The questionnaire is intended as a straightforward tool for departments to check that their project arrangements meet reasonable requirements for care and transparency, whilst also providing an environment that encourages new thinking and ideas.

Glossary

Gateway Process	Introduced (after CMI was established) to appraise all programmes and projects whether high, medium or low risk. For medium and high risk procurement projects the Gateway process is mandatory. The process examines a project at critical stages to provide assurance that it can progress successfully to the next stage. It is intended primarily for procurement projects, but can also be used for management, policy and change initiatives.
Intellectual property	Property (such as patents, trademarks and copyright material) which is the product of invention or creativity and does not exist in a tangible, physical form.
Knowledge exchange	Information sharing, particularly between organisations with different cultures, for example universities and industry.
Knowledge integration community	Community of academics, representatives from industry, business and public bodies working together on research with a commercial aim.
National Competitiveness Network	This network incorporates the Department's Science Enterprise Centres, which have a membership of more than 60 universities.
Spin-off company	New legal entity or enterprise created by a higher education institution or its employees to enable commercial exploitation of knowledge gained through academic research.
Technology transfer	Applying technology and expertise to novel situations. May lead to commercialisation of a product.

executive summary

1 Cambridge-MIT Institute Ltd (CMI) is a limited company jointly owned and controlled by Cambridge University and the Massachusetts Institute of Technology (MIT). It brings together the expertise of these two leading research universities to undertake collaborative educational and research initiatives directed at improving entrepreneurship, productivity and competitiveness in the UK. The underlying philosophy is that innovation is most likely to occur when researchers in leading institutions work collaboratively, exchanging and building on ideas, towards marketable products. CMI's mission is shown at **Figure 1.**

1 CMI Mission

To enhance the competitiveness, productivity and entrepreneurship of the UK economy..

by improving the effectiveness of knowledge exchange between university and industry, educating leaders, creating new ideas and developing programmes for change in universities, industry and government..

using a partnership of Cambridge University and Massachusetts Institute of Technology, and an extended network of participants.

Source: CMI Strategy, April 2003

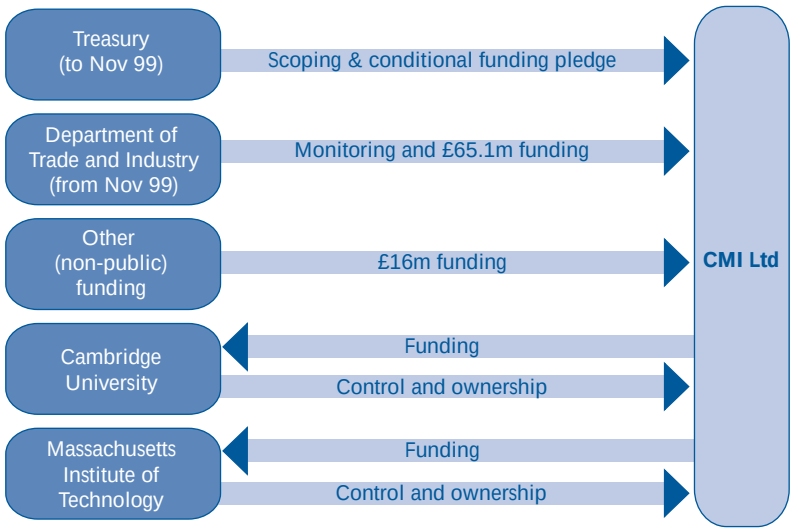
2 The Treasury announced its decision to establish CMI in November 1999, and conferred departmental responsibility for the initiative on the Department of Trade and Industry (the Department). The Department's overall targets include a commitment to improve the exploitation of science. Its Office of Science and Technology promotes excellence in science, engineering and technology, and transfer of knowledge from higher education institutions and the research councils to the wider economy. The Department is responsible for ensuring CMI's accountability for the proper expenditure of grant, monitoring progress and evaluating its impact. **Figure 2 overleaf** illustrates the four main parties involved in CMI - the Treasury, the Department, Cambridge University and MIT.

3 CMI's seven-member Board of Directors (Appendix 1 on page 32) is responsible for approving its programme of work. CMI is being publicly funded over a period of six years[1] by a grant of £65.1 million out of the Department's science budget, currently some £2.4 billion per annum, which includes funding for the seven Research Councils.[2] All CMI projects are jointly undertaken by Cambridge University and MIT, and each university receives roughly half the public funding.

1 Originally five years, but formally extended to six in 2003. The amount of grant stayed the same.

2 Biotechnology and Biological Sciences Research Council; Council for the Central Laboratory of the Research Councils; Economic and Social Research Council; Engineering and Physical Sciences Research Council; Medical Research Council; Natural Environment Research Council; Particle Physics and Astronomy Research Council.

2 Overview of parties involved in CMI



Source: National Audit Office

4 CMI is expected to take risks by funding imaginative, experimental projects. Some projects may not realise direct benefits but will still have value because they provide lessons for developing future projects.

5 A process known as "knowledge exchange" or "knowledge transfer" underpins many of CMI's activities. This process seeks to promote the sharing of good ideas, research results and skills between universities, other research organisations, business and the wider community, to enable innovative new products and services to be developed. It involves entrepreneurs and investors in helping to translate innovation into a commercial use. CMI's activities include research projects and educational programmes focused on how best to ensure effective knowledge exchange.

6 This report examines:

- **how CMI was set up** (Part 1), focusing on the involvement of the Treasury and the Department;
- **CMI's current and likely future achievements** (Part 2), with some examples of early successes; and
- **how CMI has been managed** (Part 3), including the role of the Department, CMI's early experience, and changes it has made in its approach to its programmes, building on the experience.

7 **Figure 3** summarises the chronology of events leading to the establishment of CMI and progress over the first three years of the initiative.

Establishing CMI

8 The application of research in business and industry is widely accepted as an area in which the UK needs to do better. The concept for CMI was to secure for the UK economy some of the benefits that MIT was achieving for the United States - up to March 1997, MIT graduates or faculties had founded over 4,000 companies, many of the type that use high technology to bring disproportionately large benefits to the economy.

3 Chronology of events

July 1998	Chancellor of the Exchequer visits MIT. Expresses interest in United States/UK collaboration.
September 1998	Discussions between MIT and the Treasury start.
November 1999	Framework agreement and funding of up to £68 million announced, conditional on detailed proposals being agreed. Transfer of responsibility from the Treasury to the Department of Trade and Industry. Acting UK Executive Director appointed.
December 1999	United States Executive Director appointed.
June 2000	Cambridge University, MIT and the Department of Trade and Industry agreed terms of an offer letter. CMI formally incorporated.
July 2000	Formal offer of £65.1 million. Funding started.
Year 1 (July 2000-July 2001)	Strategy developed, staff recruited, systems for project and financial management set up, project applications sought, research groups formed, first activities chosen, National Competitiveness Network set up. UK Executive Director appointed, December 2000. Department concerned that CMI would not meet continued funding conditions. The Department commissioned review by Arthur Andersen.
End of Year 1	CMI did not meet all conditions for continued funding. Continued funding agreed subject to implementation of recommendations in Arthur Andersen report of July 2001.
Year 2 (August 2001-July 2002)	Work started in response to Arthur Andersen report. Second Arthur Andersen report December 2001 found CMI had made significant progress in addressing the previous report's recommendations. Department agreed to continue funding subject to CMI continuing to meet terms and conditions of the grant offer. More projects selected. 41 projects active at end of year 2.
Year 3 (August 2002-July 2003)	New Executive Directors appointed in January 2003. Strategy redefined. More projects selected: after end of year 3, 62 publicly-funded projects active/completed. Department agreed one-year no-cost funding extension to allow time for new projects to deliver.
Years 3-4	CMI commenced systematic review of existing projects to reassess suitability for funding.

9 The idea for CMI originated in the Treasury. It was an unusual initiative that was set up in an unorthodox way:

- Negotiations for CMI were handled in two stages. The Treasury handled all the first-stage negotiations with Cambridge University and MIT, to the point of publicly announcing a commitment of up to £68 million, subject to a formal agreement of detailed proposals. Other relevant government departments were not involved in the first-stage negotiations.
- The Treasury accepted MIT's selection of Cambridge University as its UK partner - this was a key condition for going ahead as far as MIT was concerned. The Treasury considered opening up the opportunity to other universities, but recognised that pursuing this option would deter MIT, because it could be perceived as undermining the Treasury's commitment to MIT as a partner.
- CMI's innovative nature made it difficult to apply standard financial and economic appraisal to the proposal for CMI and in our view, the Treasury was right not to follow the usual arrangements. It considered alternatives to CMI, but we found no documentary evidence as to whether further appraisal options, other than the two-stage process, were considered - we would have expected to see some evidence that elements of the standard appraisal process were considered or adapted for use.

10 It took time for the Department of Trade and Industry to satisfy itself on the robustness of the proposal for CMI, and to develop relationships with key people at Cambridge University and MIT, because the Department had not been involved in the first-stage negotiations. At the same time, intensive negotiations continued between partners and their lawyers on either side of the Atlantic. The expectations of the officials and the universities were initially far apart - the former placed an emphasis on the need for accountability, whereas the latter believed that a formal agreement on funding should be relatively straightforward.

11 Over the eight months that followed the announcement, the Department negotiated an offer letter with Cambridge University and MIT. The Department was concerned to give a clear indication of what was expected. On the other hand, the two universities, and in particular MIT, firmly resisted a high level of specification, because they considered there would be a risk of reducing the scope for genuine entrepreneurship and innovation. The second-stage negotiation took much longer than Cambridge University or MIT expected. However, a large public investment was being proposed and needed to be set on a workable footing. The Department did well to negotiate an offer letter that all parties could accept.

CMI's current and likely future achievements

12 CMI is testing ways of creating and maintaining a climate for innovation. It currently has over 60 projects under way or completed. The Department recognises that some projects may not meet their objectives, but will still contribute to learning by showing which frameworks are the most successful for developing entrepreneurship.

13 The nature of CMI's activities means that many of its impacts will not be clearly known or felt for some time after the six-year public funding period is complete, because there can be large time lags in identifying outcomes. Some outcomes, particularly those relating to effects on the economy, are intrinsically difficult to measure. Nevertheless, there is potential for considerable success. **Figure 4** illustrates the main types of activity that CMI undertakes and some promising projects and programmes that are under way.

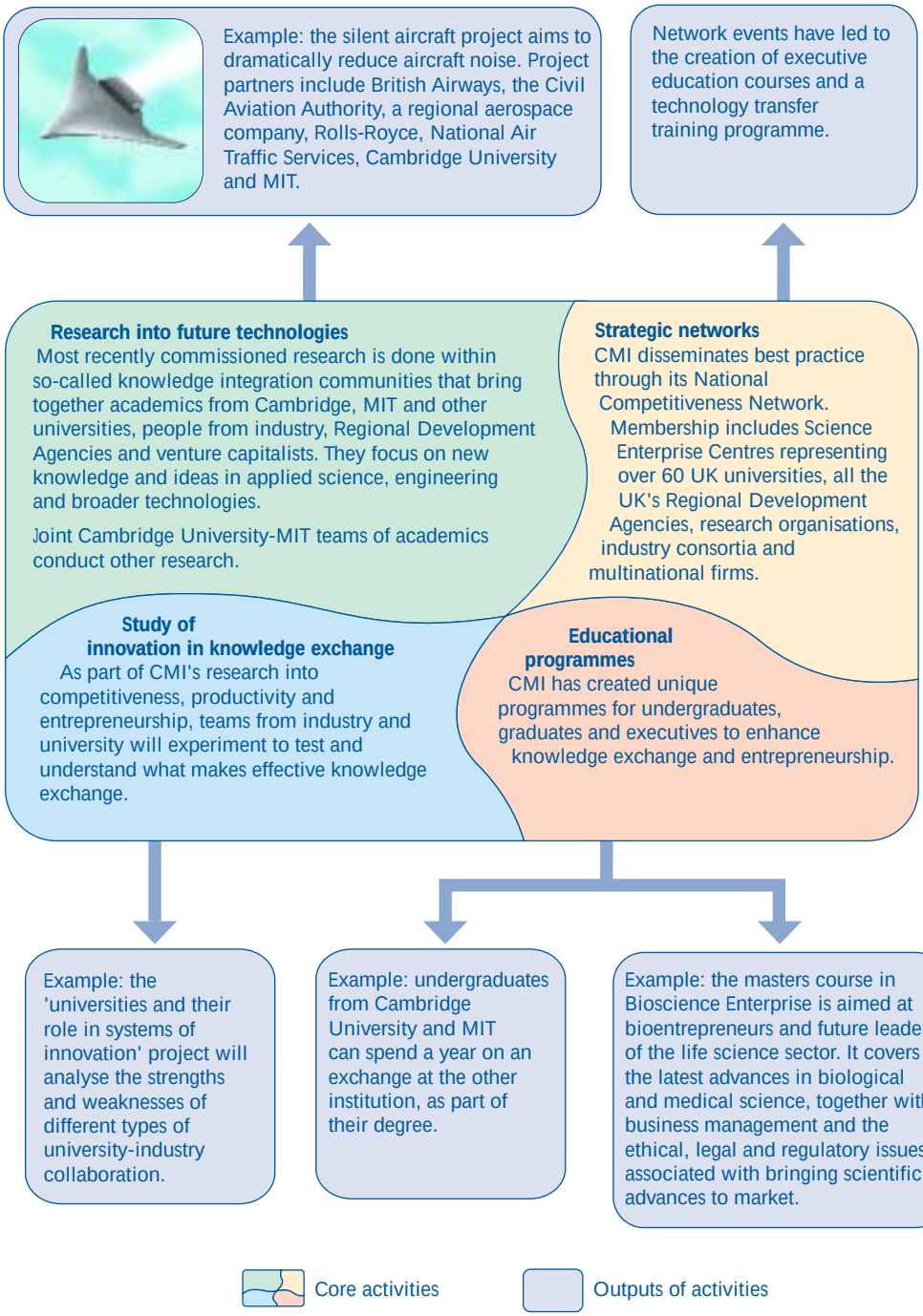
14 CMI and the Department are producing models for evaluating innovative projects. For example, CMI has started to develop measures of its success in terms of benefits to main stakeholders. The Department is in the process of appointing consultants to assess all its knowledge exchange initiatives,[3] including CMI, and to compare their findings with earlier evaluations of other similar programmes funded by the Department.

How CMI has been managed

15 There were high expectations of what CMI might do in its first two years. These were very ambitious for a number of reasons, including the experimental nature of the initiative, and the need to set up a whole new infrastructure (effectively a start-up company) to develop the strategy and operate the day-to-day business of CMI. The time required to set up the infrastructure was not explicitly recognised, and there were expectations that CMI's activities would gather momentum quickly.

3 The five other initiatives are listed at figure 13 on page 22.

4 CMI undertakes four main types of activity



Source: National Audit Office analysis of CMI's information

16 The Department and the universities both concluded that it was difficult to set specific, measurable objectives at the outset. Instead, in the first year, they agreed an operating plan comprising a list of planned activities and high-level anticipated outcomes. The lack of specific objectives, combined with low levels of expenditure and delivery, meant that the Department could not rely on the usual monitoring mechanisms - reports against objectives, expenditure and activity profiles - to monitor CMI for some time. In practice, the Department had to monitor CMI directly. This was time consuming but had the advantage of helping to develop relationships between officials and university staff.

17 The Department commissioned an external review of CMI, which reported in July 2001 that emerging concerns that CMI would not meet continued funding conditions were justified. A second review, reporting in December 2001, found that CMI had made significant progress in addressing the earlier review's recommendations. The Department has worked with CMI's Executive Directors to improve and make its plans more explicit, and to develop better processes in other areas such as cash flow forecasting. With the improvements that have been implemented since the reviews, the Department is now able to assume a more "arm's length" role.

18 From January 2003, CMI's new Executive Directors embarked on an extensive mid-term review of all CMI's programmes. They called for new research proposals in April 2003, and subjected the proposals they received to new procedures for review and approval that are designed to streamline the bidding and approval process. They are overseeing the development of improved processes for monitoring projects, and for planning and evaluating outcomes.

Overall conclusions

19 CMI is an unusual initiative and was set up in an unorthodox way. The Treasury and the Department were right not to try to follow the usual arrangements for setting up initiatives, and the two-stage process was a sensible approach, but aspects of CMI's establishment could have been managed better. For example, in our view, it would have been helpful to involve departments other than the Treasury earlier.

20 Many of CMI's key outcomes are complex and intrinsically difficult to measure, and will not be realised for some time, though there have been some early successes. The CMI experience will itself help to produce models for evaluating innovative projects.

21 Setting up CMI proved to be a much bigger task than anticipated, and very ambitious expectations initially added to the difficulty of getting a true picture of whether the progress being made was reasonable. Lack of sufficient, relevant monitoring information meant that the Department initially took a "hands on" approach to management, but over the course of the initiative, the management within CMI has developed to become more systematic.

Lessons and self assessment questionnaire

22 At the end of each main section of our report, we draw the lessons from the CMI experience for others in the public sector who have to manage innovative projects and initiatives. On the following page we also provide a questionnaire for departments to use as a non-mandatory guide when funding an innovative project to check that their project arrangements meet reasonable requirements for care and transparency, without constraining new thinking and ideas.

Self assessment questionnaire for departments to use in funding and managing innovative projects

This questionnaire is a tool for assisting departments in appraising and managing projects. The guidance is not mandatory, but arises from the important lessons learned from the appraisal and management of CMI.

The Office of Government Commerce's Gateway Process provides comprehensive reviews of delivery programmes and procurement projects at key decision points. It is currently producing high level guidance for policy, project and procurement staff on how to source, appraise and manage innovative solutions to government procurement projects.

Consultation and advice

Have key experts in other government departments been identified?
Have these experts been contacted for advice and their role in the project (if any) fully considered and discussed with them?
Have key parties outside of government been identified and consulted?
Have the lessons from previous initiatives been identified, considered and applied?

Appraisal

Has all relevant guidance, including the need to use the Gateway Process, been reviewed in relation to the initiative?
Where a decision is made not to follow guidance:
- are the reasons for not following the guidance clear, justifiable and recorded?
- is the alternative approach that has been adopted to the appraisal clear, justifiable, and is the justification recorded?

Setting up the initiative

Has the time required to build key relationships been considered at a high level and provided for?
Have non-government (particularly overseas) parties been given briefing and help in understanding the requirements of government projects?
Is there a project plan for setting up the initiative?
Does the plan provide for sufficient time and resources to set up the infrastructure required to support the initiative?
Does the plan provide for appropriate influence of the funder over key organisational aspects of the initiative (such as the skills and experience of people taking up senior appointments)?
Have responsibilities for monitoring progress against the plan been agreed and allocated to designated individuals?
Have risks associated with the initiative itself, and with setting up the initiative, been identified and assessed?
Have the responsibilities for monitoring risks and actions to mitigate them been assigned to designated individuals?
Is good progress being made in developing expected or indicative objectives, milestones and performance indicators?
Has work started to develop a strategy, and a deadline agreed for completing it?
Is there a realistic operating plan for the first 1-2 years of the initiative?
Does the planned funding profile match the operating plan?
Are there plans to review the funding profile at frequent, regular intervals?
Have good processes for appraising and managing the initiative's activities and projects been developed?
Have all important aspects of the initiative, especially any controversial aspects, been fully communicated to interested parties?

Managing, monitoring and evaluating the initiative

Have expected or indicative objectives, milestones and performance indicators been set?
Has a programme for monitoring the initiative's progress been agreed?
Does the programme provide for sufficiently comprehensive reports and monitoring?
Does the programme allocate monitoring responsibilities to designated individuals?
Does the programme provide for periodic review of objectives, milestones and performance indicators (whether or not they were indicative)?
Are the costs and benefits of projects being assessed as far and as early as possible?
Does ongoing project appraisal include a requirement to assess project risks?
Has an appropriate date been set for one or more comprehensive reviews of the strategy, objectives, milestones, monitoring mechanisms and achievements of the initiative during its expected life?
Has a long-term evaluation process been developed (or an acceptable deadline set for developing a process)?
Does the process provide for unexpected as well as expected outcomes to be identified and evaluated?