

Cambridge-MIT Institute

The Cambridge-MIT Institute Ltd. (CMI) is the strategic alliance between the University of Cambridge (CU), in the UK, and MIT. Bringing together two of the world's great universities to build on the complementary strengths of each, CMI undertakes programs to improve the effectiveness of knowledge exchange between universities and industry, educate leaders, create new ideas, and develop programs for change in universities, industry, and government. Specifically, CMI improves the effectiveness of university-industry knowledge exchange by:

- Engaging in bold experiments designed to understand and improve knowledge exchange: testing key hypotheses, studying the innovations, and codifying and disseminating the outcomes
- Setting these experiments in the context of research programs aimed at creating important new ideas, developed with a consideration for use
- Creating educational materials and programs, and educating a generation of learners who have better skills and who are empowered to exchange knowledge
- Supporting competitive exchange of knowledge and innovation in existing companies, and the more robust creation and growth of entrepreneurial ventures
- Supporting the adaptation and implementation in universities of programs that enhance education and practice in knowledge exchange
- Broadly influencing government, university, and industrial policy and practice related to knowledge exchange

CMI engages in these activities while striving to build a sustainable and enduring partnership between CU and MIT.

Noteworthy Events

The Program Review Committee was formed and met for the first time during this year. Its membership was carefully chosen to ensure that the committee members' expertise fits well with the work that CMI is undertaking and that it will be able to be completely independent. The committee will meet and report three times during 2005 and 2006. Its final report will provide an external viewpoint on CMI to CMI's UK Department of Trade and Industry (DTI) sponsors.

Knowledge Integration in Research

Knowledge Integration Communities

Knowledge Integration Communities (KICs) aim to focus on ways of enhancing the knowledge exchange process between academia and industry to push forward research and increase the pace of innovation. They focus on new ideas in applied science, engineering, and broader technologies. Each KIC is centered on collaborative research teams at CU and MIT, but also include a wide-ranging field of complementary participants and activities.

Five KICS were active during FY2005: Center for Competitiveness and Innovation; Silent Aircraft Initiative; Communications Innovation Institute, which has been renamed Communications Research Network; and Next Generation Drug Discovery. One new KIC was formed, focused on quantum computing that grew out of existing research projects. A sixth KIC, Pervasive Computing, was disbanded during the year because the collaboration as a KIC was not effective; projects contained within that KIC continued. The KIC model is generating some external interest from such entities as the Centre for Advanced Photonics and Electronics at CU, Ford, the UK's Engineering and Physical Sciences Research Council, and DTI. Papers on the KIC model were presented at the CMI Summit in November 2004.

Commercialization

A commercialization committee was formed to systematically review intellectual property commercialization from CMI-funded projects. Members of the committee are drawn from CMI's Advisory Board, MIT, CU, and Ignition Ventures. Currently, 25 innovations have been catalogued, 11 have been disclosed to CU and/or MIT, and seven are in the process of being commercialized.

Education for Innovation

The CMI Undergraduate Exchange continues as a highly successful program. Discussions are under way about enlarging the population base of students to include students in cognitive sciences, earth sciences, and possibly, political science. Fundraising has started to enable the exchange to be self-sustaining once CMI funding is no longer available.

Many educational programs are coming to completion. The biological engineering curriculum was piloted at CU's Engineering Department in January 2005 and pilot courses at both MIT and CU will be piloted in AY2006. Experiments with small-group teaching in the Department of Mechanical Engineering at MIT continue, as do experiments with educational technology and group teaching at CU. Both teaching methods will be evaluated and changes made based on the evaluation feedback. The CMI Enterprisers program held four courses this year and is seeking funds to be self-sustaining when CMI funding ends.

In postgraduate education, two new master of philosophy (MPhil) programs were started at CU. All programs appear to be financially robust and CMI anticipates that five of the six programs will be integrated into their departments. Further refinements of MOTI, the multimodule element of the MPhils, compulsory for all students, is under discussion within the programs. The proposal is to slightly expand the number of modules offered to give students more choice.

Engaging Industry in Knowledge Exchange

The advent of Special Interest Groups (SIGs) last year has led to an emerging practice of systematic dialogue to bring together industry stakeholders in specific sector areas to discuss mutual issues. SIGs have been started in transport and construction. In development now are potential KICs around the issues of health care and energy

security, with additional work being done on new century cities. An academic planning meeting for future health care was held and a stakeholder workshop is planned for representatives from the medical profession, industry, government, and patient groups. A successful high-level energy security dinner was held at which major issues facing the sector were identified. These will be more clearly articulated over the next year.

Formal agreements were signed with the Corporate Liaison Office at CU and with the Office of Corporate Relations at MIT. The focus of the activity will be to support the KICs and to develop additional industry links.

Studies in Knowledge Exchange

An increasingly sophisticated assessment activity is broadening to include many more aspects of CMI activity. Longitudinal data now exist on results from Enterprisers activities that are under analysis. The data from 2,900 student surveys (online and paper) have been entered and cleaned, and two data sets have emerged to study the determinants of high-growth innovation. A complete analysis of the role of industry gap/sandwich years on self-efficacy makes it clear that different kinds of industry work experience for undergraduates during the summer predicts differences in intention to be entrepreneurial and to remain in science and engineering rather than change fields. A new staff member at MIT will investigate the quantitative data associated with the Undergraduate Exchange. An assessment plan and appropriate instructions are being developed for UK Entrepreneurship Development Program (EDP) and an instrument has been designed to assess the mid-career women's program held in Cambridge. The findings from these data will inform continuing and new programs in CMI.

National Competitiveness Network

The National Competitiveness Network is a network to improve knowledge exchange between universities and other stakeholders to improve competitiveness, productivity, and entrepreneurship in the UK. CMI is at the center of the network, and the key partners are the Science Enterprise Centres and other organizations involved in knowledge exchange. Multiple activities took place over this year, including:

- Twelve quarterly workshops, with an average attendance of 45 people from MIT contributing expertise
- Development of entrepreneurship skills and teaching: facilitating attendance at the MIT EDP for members of the network and development of a UK EDP with members of the network
- The 2004 Competitiveness Summit, Exchanging Knowledge—Boosting Competitiveness, held in Edinburgh on November 30, with over 500 delegates
- Distribution of course material, electronic media, and lectures to the network

Future Plans

As CMI enters its final year, discussions are focusing on plans after the major DTI funding ends. With the advice of CMI's Board of Directors and Advisory Board, as well as that of the UK government, CMI will seek funding from industry, foundations, US funding sources, and the UK government.

Ed Crawley

Executive Director

Professor of Aeronautics and Astronautics and Engineering Systems

More information on the Cambridge-MIT Institute can be found on the web at <http://www.cambridge-mit.org/>.