US / UK Partnerships:
The CMI Experience to Date
A Personal Perspective

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London

July 12, 2005


The Cambridge-MIT Institute

www.cambridge-mit.org

Cambridge MIT Institute

- Concept:
  - A bold experiment and strategic alliance of two great universities
- Goal:
  - To enhance UK Competitiveness, Productivity, and Entrepreneurship
- Status:
  - A complicated birth followed by increased focus and accelerating success

Why is the CMI partnership important?

- Urgent Goal
- Innovation
- Globalization
- Major Investment by the UK
- Institutional Excellence
- The Atlantic Alliance

Ancient History

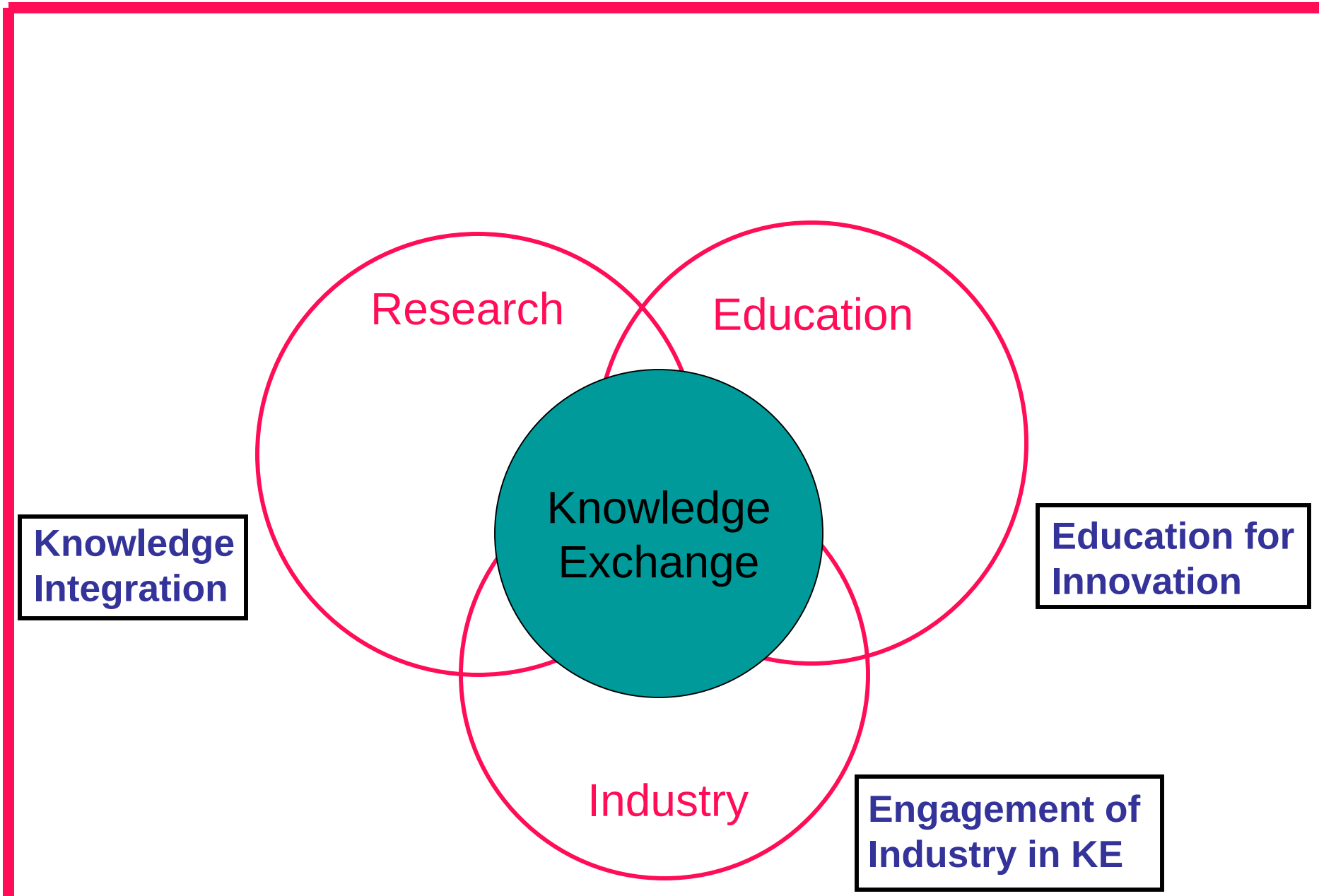
- Winston Churchill at the MIT Mid-Century Convocation
- The WWII “Rad Lab”

Modern History

- CMI's Conception
- Establishing CMI
- Institutional learning
- Refocusing, Stakeholders, and Structure

Modes and Models of CMI

- Knowledge Integration in Research
- Education for Innovation
- Engagement of Industry with Universities


Research
Education
Knowledge Exchange
Industry
Knowledge Integration
Education for Innovation
Engagement of Industry in KE

CMI
Knowledge Integration in Research

Knowledge Integration Communities (KICs) in Research

- The Stakeholders:
  - Academic researchers
  - Large and small companies
  - Government policy makers
  - Regional development agencies
  - Educators from varied institutions

- KICs are engaged during:
  - Project Development
  - Project Execution
  - Dissemination of Results

Knowledge Integration Communities

- Examples
  - Silent Aircraft
  - Next Generation Drug Discovery
  - Pervasive Computing
  - Competitiveness and Education
  - Quantum Computing

Knowledge Integration Communities

- Status: An experiment / work in progress
- Faculty Acceptance: Very Good
- Spirit: "*Chance favors the prepared mind.*"
  – Louis Pasteur

CMI
Education for Innovation

Education for Innovation

- The CMI Student Exchange
  - Changing Lives
  - Changing Directions
  - Changing Institutions

Education for Innovation

2. Essential Features of our Model:
   - Deep Conceptual Knowledge of S&T Fundamentals
   - Product Development / Team Work / Organizational Context
   - Sense of Self-Efficacy

Education for Innovation

3. Experiments and Developments - Examples:
   - Interdisciplinary Undergraduate Streams
   - Postgraduate Courses Marrying S&T with Management and Experience
   - Renewing Skills and Practice in Engineering Education
   - Programs for Mid-Career Women Entrepreneurs

CMI
Engagement of Industry with Universities

Engagement of Industry with Universities

- Sector Interest Groups for Senior Executives
  - Facilitate Knowledge Exchange in Academically Non-Traditional Industry Areas
  - Address Key Issues in Sector Competitiveness, Creativity, and Productivity
  - Improving Sector Directions and Opportunities
  - Testing the CMI Hypothesis that Careful Engagement of Industry with Academia will Improve Sector Competitiveness

Engagement of Industry with Universities

2. National Competitiveness Network
   - NCN Summit: Annual High-Level Conference of Academic, Industry, and Government Leaders
   - NCN Forums: Occasional Focused Explorations of Policy Issues
   - NCN Workshops: Quarterly Hands-On Explorations of Best Practice

Engagement of Industry with Universities

3. Praxis
   - Professional Training and Development for Technology Transfer Personnel in the UK
   - An Example of Institutional Learning and Effective Outreach

CMI
Scope: Research, Education, Industry

Scope of Initial Research

- 29 legacy projects, now managed as 16 research teams in four thematic areas:

AREA	EXAMPLE
- MEMS/Nanotech	nanoscale arrays
- Materials	carbon nanotubes
- Biotech	tissue engineering
- Energy/Environment	energy-saving buildings

- Highlights:
  - Aging infrastructure a major coup for LUL/Thames Water
  - Light-weight metals - major new technology
  - Biomaterials, powerful suite of patents leading to start-up
  - *Rhodococcus* - a low cost treatment for TB

- 15/16 projects with commercializable outputs including 15 patents.

Some Specific Research Outcomes

- *Rhodococcus* as Biological Catalysts for Chiral Synthesis and Novel Pharmaceuticals
- Joint Urban Design Studio
- Integrated Low-energy Building Design
- Biomaterials and Tissue Engineering
- New chemistry in supersaturated CO2
- Nanometer scale toroidal magnetomemories
- Cambridge-MIT axis on quantum cryptography
- Diamond-like carbon and nanotube MEMS
- Ultralight metal sheeting
- Monitoring aging infrastructure

Scope of Educational Programs

- Six New Multidisciplinary MPhil Programs at Cambridge: 160-180 students/year.
- Undergraduate Student Exchange (CU-MIT) 140 students each way to date.
- Major Engineering Pedagogical Reform initiated.
- New Curricula in MEMS and Post-Genomic Biology.
- Emphasis on Design / Build

Scope of Industry Engagement

- Two Strategic Partners -- BT and BP
- Over 60 companies are involved with our legacy projects and Knowledge Integration Communities
- Over 40 companies involved with our MPhil projects
- Over 30 companies involved in our Strategic Interest Groups [Ground Transport, Construction, Leisure, Retail, …]

Some Lessons of the CMI Partnership

- Cultural Differences and Change
- Trust
- Stakeholder Expectations -- Focus, Goals, Exchange, Time Frame, Clarity
- Patience
- Critical Mass
- Important Goals and Topics

An Appreciation

Alex Trotman
Lord Trotman of Osmotherly
1933 - 2005

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