

TOP

FLOOR

News from the Centre for Business Research, University of Cambridge

Issue 10: Spring 2005

Safeguarding the 'Eureka' moment



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All change on the Top Floor



CBR Research Staff

It's all change at the Centre for Business Research (CBR), which celebrated its tenth birthday in October 2004. We have a new acting director, and a new look to our research programmes.

Prof. Alan Hughes has been Director of the CBR since its inception. For the last four years, he has also been Director of Research at the Judge Institute of Management. Taking sabbatical leave from these administrative posts until December 2006 allows him to spend more time on his primary interest – research. (He is part of the CBR team running two linked, international research projects on Innovation and has ongoing research on mergers and corporate governance).

In his stead, Prof. Simon Deakin is Acting Director. Simon, Robert Monks Professor of Corporate Governance at the Judge Institute, is a long-standing member of the CBR, and runs its programme of research into Corporate Governance.

Enterprise and Innovation

In another change, the CBR's research activities are being reshaped. Until now, CBR research has been divided into three programmes: Innovation and Productivity; Corporate Governance; and Enterprise and SME's.

But recently, innovation policy debate has become focused on smaller firms – particularly high-tech smaller firms – and their potential to drive economic growth and create jobs.

With a national reputation for its studies of the growth and survival of these smaller businesses, the CBR has decided to combine its research programmes in Enterprise and Innovation, since the issues involved are now so closely linked. The CBR's Innovation research is also being extended to include the activities of larger firms and a focus on the University/Industry interface. In so doing, the CBR will continue to contribute to the policy debate by conducting research that identifies the factors affecting firms' ability to innovate, survive and grow, and their links with this country's pre-eminent Science base. For more details of our work in this area, please visit our website: www.cbr.cam.ac.uk/

Editor's note

Much work conducted at the CBR over the past ten years has been made possible by our long-term sponsors, the Economic and Social Research Council. As we enter our 11th year, we are grateful for their previous, and continuing, support for our work.

The ESRC sponsored, for example, the study of firms in the aerospace and biotechnology sectors featured on page three. This study shows that the ability of firms in these two key industries to develop and commercialise new technologies is being adversely affected by fluctuations in the macro-economy. At a time when policy thinking strongly encourages UK firms to leverage the excellence of the UK's science and technology base for economic advantage, these findings make worrying reading.

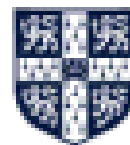
The ESRC also sponsored much work undertaken by the economic geographer David Keeble. David, a former assistant director of the CBR, was a pioneer of research into regional development and the effect on it of innovation and entrepreneurship. We feature his work on page seven.

Meanwhile on the centre page, we profile Prof. Richard Lester, who leads MIT's Industrial Performance Center, from where he is collaborating with CBR staff on two studies of the role of universities in innovation. We interview him about his work, and his new book, "*Innovation - The Missing Dimension*", a cogently-argued plea for companies and governments to recognise the intangible, but vital role, that universities can play in innovation. He argues that their role as spaces where chance conversations between researchers, and the teasing out of new lines of scientific thought, can take place is just as valuable as traditional 'analytical' processes in developing new innovations.

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Absorbing the shocks

Have terrorist attacks, falling shares, and the rising pound, adversely affected Britain's key high-tech sectors? A CBR study has been finding out.

What effect are the ups and downs of the UK economy having on the growth and success of the UK's technology-intensive businesses?

Michael Kitson, a long-term associate of the CBR, has been looking for the answer. Since early 2002, he and his colleague David Primost have been studying firms' reactions to 'macroeconomic shocks' — such as changes in tax, employment and inflation rates — by regularly interviewing 14 biotechnology and seven aerospace businesses, to see whether the slowdown in economic growth has influenced their development.

Their purpose was to consider how changes in the macro-economy influenced managerial behaviour and corporate strategy, and how this might affect competitiveness and long-term growth. Was the development and commercialisation of technology being influenced by short-term economic fluctuations?

Their conclusion is a resounding 'yes'. Firms in the study have changed considerably in response to a variety of shocks, though those changes differ according to sector.

Stock market falls

As well as the major geopolitical shock of the terrorist attack on 9/11 and its aftermath, both industries had to contend with depressed equity markets. This hit the value of technology stocks particularly hard: some biotech firms in the survey found themselves valued at less than the value of their cash assets. Both industries also saw falls in output and employment: aerospace exports and jobs, for example, both fell by 20 per cent during 2002.

How did firms react? In the aerospace industry, Kitson and Primost found managers focused on responding to declining share prices and fluctuations



Michael Kitson (inset) has been studying the impact of economic ups and downs on aerospace firms

in exchange rates. In biotech, however, firms were most concerned by the fall in equity markets, as this reduced the number of prospective exit routes for their investors, the venture capital firms (VCs). This made the VCs more risk-averse, and worsened an already significant 'funding gap' for UK biotech firms. "This may have permanent impacts on the commercial exploitation of such technologies," say the researchers.

While aerospace firms also saw their shares fall, their major 'shock' was exchange rates: sterling appreciated by 27 per cent against the dollar, a significant change in an industry where most products are priced in dollars.

Cyclical downturns

But aerospace is a fairly mature sector, and the researchers found firms responding with moves to try and insure themselves against the fluctuation of business cycles generally, rather than to this downturn in particular.

Some aerospace firms responded by developing a portfolio of activities, with the aim of selling into a wide range of markets with differently phased business cycles. Others focused on minimising the impact of exchange rates by moving to match revenues and costs in the same currency: one company with half its sales in the US moved half its production to the US. Such strategies suggest that diversification may have insulated the aerospace business from the impact of variable economic cycles.

But the cyclical nature of downturns proved a significant problem in the biotech industry, a sector dominated by small firms many of which have yet to bring products to market. Here, Kitson and Primost found that firms without large cash reserves and revenue streams were trying either to generate more revenue — for example, by acquiring other businesses — or to reduce their cash burn. But for biotech businesses, cost-cutting options are limited: the only real way to cut the cost of clinical trials of a new drug, for example, is to terminate the trial.

While the firms were trying to generate cash and cut costs, the investors' behaviour was also changing. VC firms shifted investment to businesses with later stage technologies that were closer to market: these they perceived to be lower risk, and to offer greater potential for an eventual exit. And the private biotech firms responded by dropping their earlier stage technologies to concentrate on later stage products nearer to revenue. As the researchers report, "The decrease in appetite for risk in the markets has skewed the technology value further from early stage towards later stage."

Kitson and Primost conclude that in biotech, the cyclical nature of funding shortfalls is proving a threat to the future development of technology and suggest businesses recruit finance and marketing specialists to help them bridge the funding gap.

• For more details of the research, please visit:
www.cbr.cam.ac.uk/research/programme1/project-8.htm

Innovation – the Mis

The accidental, open-ended nature of innovation makes it exciting. But safeguarding the environment where it can happen is under threat, according to CBR associate Prof. Richard Lester.

Inventions are found in the oddest places. Take the magnetron — a tube invented during the Second World War, which produces microwaves and was used to improve Britain's radar system. One day in 1946 while running some tests on it, an American engineer found that the chocolate bar in his pocket had melted. Two more experiments (one involving popcorn, the other an exploding egg) confirmed the potential of the microwave oven.

There are many other examples of the innovation as a happy accident. An American teenage chemist discovered the first synthetic dyes when a homework experiment to synthesise quinine went wrong. Another chemist, this time working for Du Pont, stumbled across Teflon while trying to produce a non-toxic refrigerant.

It is precisely the accidental nature of innovation that makes it exciting. It can happen in unexpected places, at unexpected times, and through chance interactions. But if companies and governments don't recognise that, says Prof. Richard Lester, and don't safeguard the 'interpretive spaces' where such ideas can emerge, they may end up strangling the innovation process they are trying to preserve.

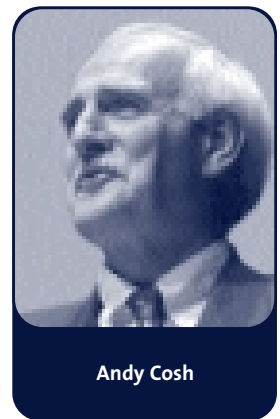
Innovation benchmarking

Prof. Lester is the Director of the Industrial Performance Center at the Massachusetts Institute of Technology (MIT). He is currently collaborating with the CBR's Dr Andy Cosh and Prof. Alan Hughes on their "International Innovation Benchmarking" project. This ambitious study, funded by the Cambridge-MIT Institute, is questioning 4,000 companies of all sizes in the US and the UK to create the first comparison of their innovative efforts and activities, and their resulting performance.

Such a project fits neatly into the work of the interdisciplinary Industrial Performance Centre, which studies industries in the US and abroad. Prof. Lester has been involved since its inception. The IPC's first major study of the woes afflicting America's faltering manufacturing production resulted in a best-selling book, *Made in America*, which has sold 300,000 copies



Alan Hughes



Andy Cosh

in eight languages. Since then, Prof. Lester has seen the research agenda evolve, from a focus on manufacturing alone to manufacturing and services, and from production to innovation.

Innovation is the subject of his latest book, "*Innovation — The Missing Dimension*", co-written with Prof. Michael Piore of MIT's Economics Department (Harvard University Press, 2004). In it, he and Piore argue that for innovation to prosper, companies must engage in both 'interpretive' and 'analytical' processes. The latter, says Prof. Lester, are well articulated by companies who see new product development as a problem-solving process that starts with researching and identifying customer needs, and continues via developing a product design concept that will best solve the problem, breaking the design task into its component parts, and organising the resources to bring the project to fruition.

But such a process has a fatal flaw. "The management literature emphasises the importance of listening to the voice of the customer," says Prof. Lester. "But quite often the customer does not really know what she wants or needs. Ten years ago, for example, you might have been able to say that you wanted a cell (mobile) phone. But you certainly would not have been able to say that you wanted one with email, or that you wanted an MP3 player. These are innovations that have emerged from open-ended conversations between designers and customers."

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Public spaces

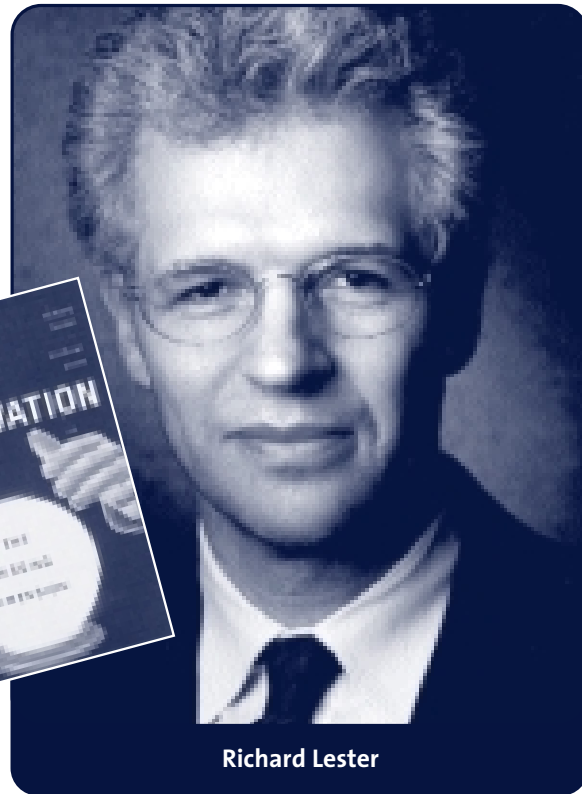
He adds, “Companies have to create room for these conversations. The spaces where they take place tend to get shut down.” The temptation for firms, he says, is to see the analytical, problem-solving process as the only method of generating innovation. “And problem-solving certainly has a vital role to play. But the difficulty is that we don’t have a way of thinking about the open-ended, exploratory part of the innovation process, the more interpretive one, and we don’t have a vocabulary for it.”

Using concrete examples of innovations from some of the most dynamic sectors of the economy, including mobile phones, medical devices, and fashion blue jeans, the book shows how innovative companies have managed to prevent vital interpretive processes from being crowded out by the insistent demands of problem-solving, and have successfully combined the two processes within the same organisation. In many of these case studies, innovation grew out of sustained interactions between firms with very different histories and industrial cultures. But Prof. Lester also argues in favour of the role that universities can play in boosting innovation. (Prof. Lester is also the MIT collaborator in another CBR project with Andy Cosh and Alan Hughes on ‘The role of universities in systems of innovation’.) This is a pertinent argument in the UK where considerable policy attention is focused on encouraging greater university-industry collaboration. Prof. Lester is vocal on the need to keep these public spaces alive, and to encourage policy makers and businesses to recognise that universities can help with both the analytical, and the interpretive, dimensions of innovation.

Problem solving

“When you ask companies what they look for in their interactions with universities, the answer varies,” he says. “Some companies look to university collaborations to help them solve specific technical problems. Other companies say that the aim in their relationships with universities is just to be around the campus, participating in discussions about the future directions of science, technology, and markets, possibly not with a fixed goal in mind.

“In fact, the same company may run two different university collaborations, with two different objectives. A mid-West manufacturing firm may work with its local



Richard Lester

Images courtesy of Harvard University Press

university on a very well defined project that contributes directly to the improvement of one particular product; it may also, for example, conduct an interaction with MIT in a very different way, getting involved in on-campus research that may not immediately feed into products.

More light will be shed on this issue by the “Innovation Benchmarking” project, when it reports later this year on the reasons why businesses collaborate with universities, and what impact this has on their profitability and performance.

Meanwhile another sort of collaboration — that between the CBR and the Industrial Performance Center — is one that Prof. Lester is enjoying and finding fruitful. “I would like to do more research together with the CBR,” he says. “We see the ‘Innovation Benchmarking’ project as contributing not only to the innovation debate in the UK, but also in the US, where there hasn’t been a study like this for a long time.”

• For more details about the ‘Universities and Innovation’ or ‘Innovation Benchmarking’ projects, please see: www.cbr.cam.ac.uk/research/

Pioneering the study



David Keeble

The issue, on 'Entrepreneurship and Regional Development', was dedicated to David Keeble "in recognition of his academic leadership in this field of research".

Dr Keeble, a founding member of the CBR and Director of its small business programme of research until his retirement in 2001, spent his 40-year career at Cambridge University researching, and teaching on, industrial location dynamics and local and regional economic restructuring in Britain and the European Union. He pioneered research into how entrepreneurship, innovation and enterprise shape regional

*David Keeble, one of the world's foremost economic geographers and a co-founder of the CBR, has been honoured with a special issue of *Regional Studies*, for his "seminal contributions to the study of regional entrepreneurship, innovation and the economics of small- and medium-sized enterprises (SMEs)".*

economic development, and how they are themselves geographically constituted phenomena.

Much of his work — on the creation, location and growth of SMEs, and the clustering of high technology businesses — took place during the period when Cambridgeshire was transforming itself from a relatively poor, agricultural county into the booming high-tech regional economy known as Silicon Fen. The fascinating research material on Dr Keeble's doorstep was reflected in a number of CBR Working Papers on, for example, internationalisation processes and local embeddedness in small high-tech firms (CBR Working Paper 53); the differences between the Oxford and Cambridge high-tech clusters (CBR Working Paper 65); local industrial

Squandering human resources

A new CBR survey paints a pessimistic picture of the attempt by new regulation to upgrade British working practices.

"A generation ago... Allan Flanders wrote of the systematic use of overtime in British industry that its 'fatalistic acceptance was symptomatic of management's casual attitude towards the use of human resources'. Forty years on, it would seem that little has changed."

This is the conclusion of a new paper published by the Centre for Business Research, which suggests that if our

attitudes to working time are anything to go by, the likelihood of new 'reflexive' forms of regulation changing Britain's working practices is extremely limited.

"For the majority of UK employers and employers' organisations, the conduct of human resources management is an issue for managerial prerogative," the research team reports, "on which 'soft law' and corporate governance mechanisms barely impinge."

The paper, by Catherine Barnard, Simon Deakin and Richard Hobbs, is a follow-up to their widely publicised EC-funded study last year of how the Working Time Directive was operating in the UK. That research focused on the use of the

of regional enterprise

dynamics in East Anglia (CBR Working Paper 96) and the role that university and technology parks played in Cambridge's development (CBR Working Paper 218).

But Dr Keeble's interest in clusters extended beyond the UK. In a number of publications in the mid-1980s, he focused on regional development and high-tech clusters in Europe, and during the 1990s, he led CBR involvement in an international research network studying the development of key high-tech European clusters in cities like Grenoble, Munich, Helsinki and Barcelona.

One of the first economic geographers to recognise the key importance of small enterprises for regional economic growth, Dr Keeble has played a large part in the CBR's regular 'Enterprise Britain' studies, which biannually put a finger on the pulse of Britain's smaller businesses. For these studies, he tracked the changing regional and urban-rural differences in the behaviour and performance of such firms. He was keenly interested when the dynamism demonstrated by rural SMEs during the 1980s and '90s suddenly ground to a halt towards the end of that decade. "At a time when the rural economy and policy is attracting considerable political interest, this finding is clearly of considerable concern," he told *The Independent* in August 2000.

In 2003, Dr Keeble was awarded the Patron's Gold Medal by the Royal Geographical Society in London in recognition of his outstanding lifetime contributions to the development of research and understanding in economic geography.



Photograph courtesy of Mark Miniszko

▲ Cambridgeshire – transformed from farming county to high-tech region

- Search www.cbr.cam.ac.uk/publications (the CBR's online publications database) for more details of Dr Keeble's published research.
- The issue of *Regional Studies* on 'Entrepreneurship and Regional Development', is Vol. 38.8, November 2004. For more information, please visit: www.regional-studies-assoc.ac.uk

opt-out by employers, and the fact that its widespread use meant that the opportunity for employers to use the Directive to rethink inefficient working practices had been lost.

In this subsequent work, Barnard, Deakin and Hobbs looked at 'reflexive' laws like the Directive — which was meant to add a 'reflexive' approach to working time regulation, introducing more flexibility for employers and unions to use self-regulation, and craft local-level solutions in negotiating working time settlements. But in practice, concessions like the use of the opt-out weakened the Directive, allowing both employers and employees to ignore its intentions to shorten the working week.

Low productivity

In their study, the researchers encountered some examples of firms where reducing working hours had improved efficiency. But they also interviewed

respondents like an AMICUS representative, who told them that long hours working was not so much at the core of British business efficiency as a reflection of 'the British disease of low productivity'. In his view, this reflected a widespread culture where traditionally staff are expected, and even praised, for working overtime, "rather than being condemned for not being able to do the work in the right time."

Against this background, says the report, "the high hopes invested in reflexive law and the 'new Corporate Social Responsibility' (for changing working practices) have not so far been borne out by the experience of the implementation of the Working Time Directive."

- CBR Working Paper 294, *Reflexive Law, Corporate Social Responsibility and the Evolution of Labour Standards: The Case of Working Time* by Catherine Barnard, Simon Deakin and Richard Hobbs, can be downloaded from the CBR website at: www.cbr.cam.ac.uk/publications

When I'm re-calling you...

“French car giant Peugeot is recalling 270,000 models because the brake pedals could FALL OFF”, screamed *The Sun* in November 2003, when car maker Peugeot-Citroen had to carry out a safety recall.

The intemperate tone of the report suggests that such product recalls are rare in the automotive industry. But in fact, the opposite is true. As a new CBR working paper shows, vehicle manufacturers are currently recalling a million vehicles a year - and the figure is set to rise.

This is a puzzle, say researchers Hilary Bates, Matthias Holweg, Michael Lewis and Nick Oliver, in a preliminary study of recalls over an 11-year period (1991-2002) which paves the way for more detailed research of this area. Currently, the automotive industry faces many challenges, including long-term over-capacity and the consequent pressure on manufacturers' profitability. “In such an environment”, say the authors, “anything that risks damage to brand value, or drives up operating costs, is obviously highly undesirable. One such phenomenon is safety recalls.”

Why, they ask, are there still so many? And why is there such a significant difference in the rates of vehicle recall between manufacturers? The statistics, ranking manufacturers by their UK recall volumes as a percentage of their vehicle registrations, make fascinating reading. (Especially to anyone considering buying a new car.) Eight of the ten companies that have the lowest recall rates

have East Asian connections, and five are Japanese-owned: Isuzu and Subaru, for example, are the only manufacturers with zero per cent recalls.

At the top of the table for recalls are Ferrari, BMW-Mini and Land Rover — who “tend not to be high volume producers,” say the researchers. This “implies a link between craft, non-standard production and propensity to recall.” However, they add, “There is no obvious pattern to the ranking, in terms of what types of manufacturers are prone to recalls... Some very high volume producers such as Vauxhall (GM) and Volkswagen also appear in the top 10 companies in terms of recall rates.”

This paper is a preliminary work on vehicle recalls - an area, say Bates, Holweg, Lewis and Oliver, in which surprisingly little research has been conducted, given that the costs to manufacturers of the one million recalls per annum in the UK must be very high - both financially, and in terms of damage to their reputations. Having looked at the statistics, the research team now hopes to go on and find out why recalls are increasing, and whether recall rates relate to product development processes and lead times. “Product development lead times in the automotive industry have been falling and are set to fall further,” they say. “Is one of the side effects of faster times-to-market that the vehicles have more faults when they get [there]?”

• **CBR Working Paper 295, Motor Vehicle Recalls: Trends, Patterns and Emerging Issues, can be accessed via the CBR website: www.cbr.cam.ac.uk/publications**

Research with an Italian flavour

Late last year, the Centre for Business Research hosted a distinguished, but very familiar, visitor. Fabrizio Traù, Senior Industrial Economist in the Research Department at the Confederation of Italian Industry, has visited the CBR five times in the last decade to conduct research.

The Confederation of Italian Industry plays an active role in shaping economic policy. Traù's role includes co-ordinating the production of the CII annual report, which tries to analyse the latest trends and patterns in Italian industry. “It's a huge job, involving about 100 researchers from many institutions,” he says.

Traù's own research interests have focused on the relationships between firms' growth and changes in the macroeconomic environment since the 1970s, when the oil shocks heralded the end of the ‘Golden Age’ of the industrial economy, and the demise of a regime of stable growth rates. Fabrizio says that the work he has conducted at the CBR as a Visiting Fellow over the last decade allowed him to develop his ideas about the ways firms' size and structure changed in response to this, and to the two-fold challenges of increased economic uncertainty and international competition. At the CBR, he published first a theoretical paper on firms' growth processes (*Why do Firms*

Grow?, CBR Working Paper 26) and subsequently two papers aimed at explaining on theoretical grounds the major changes that occurred in firm size distribution over the last quarter of the 20th century. (*The Rise and Fall of the Size of Firms*, CBR Working Paper 156, and *The Macroeconomic Environment and the Size Pattern of Business Firms*, CBR Working Paper 192). Both papers later appeared as chapters in his recent book, *Structural Macroeconomic Change and the Size Pattern of Manufacturing Firms* (Palgrave Macmillan, 2004).

Fabrizio's future research plans focus on organisational change within firms, and the ways in which they alter their internal structure - for example, reconfiguring their supply chains - in a rapidly changing and increasingly global market place. “My research work in these areas is closely related to those of the CBR,” he says. (Indeed, the CBR's Christel Lane and Jocelyn Probert are currently working on a Cambridge-MIT Institute-funded project studying firms' responses to globalisation.) “And I hope it will be possible to develop more formal, future collaborations with the CBR.”



Fabrizio Traù