BUSINESS VOICE

The CBI magazine   **September 2003** £3

Ford, at 100 years of age, is in search of a European makeover. David Thursfield is the man in the hot seat.

A VERY DIFFERENT FORD

Model railways
Passengers are still waiting for a system that lives up to its promises.

Office kudos
There's more to a relocation than just property costs. Your people come first.

The ideas labs
Commercial hubs or futuristic romper rooms for the R&D teams?

REGULARS

FEATURES

Thursfield's thirst for number one

This year Ford is 100-years-old. But the celebrations won't go with a bang unless its European operations return to profit – this year to June it lost $774m in Europe. David Thursfield is the man slugging it out. By Richard Bremner

Seven years after privatisation, passengers are still waiting for a train service they can rely on. We ask the industry what they have done to improve performance and when the results will be visible? By Simon Montague

Many UK firms have cut or cancelled R&D spend in the recent downturn. Is this just a question of tighter budgets or is business tired of funding blue skies projects that never see the light of day? By Matthew Stibbe

There's more to relocation than pure property costs. The number one issue is whether your staff will follow – which is rare – or their seats can be filled locally. But the top growth centres in the future will be "cool" places to live. By David Lawson

Bright sparks?

R&D labs still have that gee-whizz factor. But business wants value-for-money as well as the white heat of technology?

By **Matthew Stibbe**

A converted Guinness warehouse in Dublin houses Media Lab Europe. Here, in its own words, "rising stars, hackers, passionate geniuses, socially conscious, broadly skilled all-rounders" work to "expand human potential through invention." It is an offshoot of MIT's Media Lab, based in Cambridge, Massachusetts, and like its parent, it is a role model for advanced research that sits somewhere between academic blue sky thinking and corporate product development.

From the outside Media Lab Europe appears industrial and somewhat oppressive. Inside it has all the chic accoutrements of a New York loft conversion with polished floorboards, lofty ceilings and exposed service pipes. There is a brewery tang in the air. Young men and women, some from academia, some on placement from corporate sponsors, work on prototypes and demonstrations. A few projects are whimsical, like a remote-controlled car that sends force feedback and vibrations to its hand-held controller. Others are more focused. There's a game called "Relax to Win" to teach hyperactive children to calm down by giving feedback on their brainwaves in the form of a game. Another researcher has combined an MP3 player with a portable wireless network base station so the wearer becomes a mobile radio station. The demos are great but does the Lab give good value?

The new Model Lab

MIT's Media Lab was founded in the early eighties by Nicholas Negroponte and former MIT president Jerome Wiesner. It brought together such diverse themes as electronic music, graphic design, holography, artificial intelligence and robotics. It attracted star researchers like Marvin Minsky and Seymour Papert. Early successes in digital video and multimedia proved the success of its cross-disciplinary approach. Negroponte became the spokesman of

the dot.com age and the Lab demonstrated talents for PR and attracting corporate sponsors. Media Lab Europe opened its doors in Dublin in July 2000.

The Lab encourages the collaboration of academia and business but, in doing so, walks a tightrope between intellectual independence and the need for corporate sponsorship. It is not, however, research on the cheap. Projects are initiated and run along academic lines by faculty and students – the Lab has several hundred masters and doctoral students. Most of the Lab's work is divided into five consortia: changing places, digital life, digital nations, organising information and things that think. Each one embraces several inter-related research projects and is sponsored by 20 to 50 corporates.

Over 125 corporations, including BT, Kodak, Lego, and Motorola, sponsor the Lab's work. Sponsors are drawn by its innovative work and novel approach to licensing intellectual property. The cost of entry starts at $100,000 for an affiliate sponsorship but $200,000 a year buys full intellectual property rights. Paying more gets sponsors greater involvement – such as the right to have a full-time liaison person in the lab and some influence over research themes. While they pay, sponsors enjoy all the benefits of lab ownership.

At the MIT Massachusetts campus, the Lab is housed in an avant-garde building designed by I M Pei (of Louvre pyramid fame), best-described as a giant white cube. Walter Bender, who took over from Negroponte as executive director, looks more like the founder of a dot.com than an academic from central casting. He's as laid back as a Friday afternoon. He lists some of the themes being explored at the Lab: "Machines with common sense, bits and atoms, viral communications, and curious machines." The Lab has inspired some serious product innovation from Apple's QuickTime to Lego's Mindstorms robots.

Besides a well-rehearsed sales pitch, Bender has some generic advice for working with academia: "There are two ways of doing it. One: you know what you want and you ask academia to get it done. Two: look at it as a place to take the risks you can't. But make sure you have a dialogue with them, not a monologue."

BT's man in Media Lab

Steve Whittaker is BT's liaison at the Lab in Dublin. His brief is to contribute to research at the Lab and keep a weather eye on the implications it may have for his employer.

The white board above Whittaker's desk is filled with neatly written packets of data linked by arrow spaghetti. His conversation is like his white board – so is his job. There are three reasons, he outlines, for BT's involvement here. First, it acts as a radar to identify downstream opportunities: "If it moves and looks relevant to our customers, we should be in that space." Second, it acts as an ideas factory to inform the way BT thinks about strategic business transformation. Third, it is a forum for partnerships and business development with the other 125 corporate sponsors and lab spin-out companies.

The Innovator's Dilemma, a book by Harvard professor Clayton Christensen, is his bible. Whittaker believes that BT is at risk from disruptive technologies arising in unobserved markets. As he pulls one demo after another out of the Lab's rattlebag of cool stuff, he makes this point again and again. Wireless networking might make BT's stranglehold on copper cable irrelevant. Software radios might turn every PDA (personal digital assistant) into a cell phone. Smart dust (tiny, networked sensors) might be a new business opportunity. Software agents might revolutionise user interfaces. All of these are simultaneously threats and opportunities. Whitaker's presence at the Lab is BT's insurance policy.

Back home, BT has one of the UK's biggest research centres at Adastral Park, near Ipswich. The self-proclaimed "thought-powerhouse" looks like a bit of old communist Eastern Europe dropped in the middle of

The state of UK corporate R&D

The UK is some way behind its main rivals in terms of R&D intensity (R&D as a percentage of sales), according to the government's R&D Scorecard. In 2002, it managed 2.2 per cent, compared to 3.6 per cent in Europe, 4.1 per cent in the rest of the world (mainly Japan) and 5.1 per cent in the Americas (mainly the US).

There are encouraging sector specific trends in the UK but the overall picture is depressing. The CBI's recent report on innovation suggests that the economic downtown has led to cutbacks. Of the largest firms, 43 per cent have reduced or even cancelled R&D spending lately. While 75 per cent of large companies have a specific future-watch activity, just 20 per cent used their IT systems to manage ideas, only 31 per cent conducted a regular audit of their innovation processes and less than half had a specific board-level champion for innovation.

Patent statistics reveal a similar story, with the UK showing a consistent decline during the nineties. National productivity statistics tell the same depressing story: the DTI's Assessment of UK Innovation Performance and Policy says "the data broadly shows that UK firms, particularly larger firms, invest less in innovation-related activities compared to their major competitors and consequently this results in fewer innovation outputs."

the Suffolk countryside. Andy Gower, a manager there, says: "We try to push the boat out, generate intellectual property and stimulate thought within BT." If Whittaker is the advance guard, BT Exact (BT's research division) is the 3,000-strong army.

A typical BT Exact project is the development of a video codec (a piece of software that compresses and then replays digital video) that will allow users of existing GPRS-equipped mobile phones to download video clips like the news or sports coverage. Based on technology originally developed at the Lab over a decade ago, this gives existing phones a capability that many thought could only be possible on a next-generation 3G phone.

Mapping out the future

It's not just multinationals that invest in research. Ordnance Survey is a 1,500-person business and has just 32 people in its research and innovation unit in Southampton. It is about to become a Media Lab sponsor, pre-empting a structural change in its business. "The reason we're doing this is that we're no longer just a mapping company," says Chris Parker, research and innovation manager. "We're now an information and database business. Mapping is just one part of a database query."

Historically, Ordnance Survey research has been targeted at optimising geographical data capture. Now it is looking at the ways in which people use that data too. A good example is this year's Jaguar demonstrator. This uses a mobile phone equipped with GPS satellite navigation to deliver a map based on the user's current location. It also delivers location-based information such as a safety rating linked to crime statistics, a list of local places of interest and "virtual graffiti" left by other users of the system.

The organisation is using links with MIT to change its own culture. "We're trying to achieve a 70 per cent reduction in capture and delivery costs," says Parker,

"and, by 2006, 50 per cent of new revenue should come from ideas generated in our MIT group. They're incredibly stretching targets but they force us to think radically about how we go about finding solutions." For Ordnance Survey, the Lab is a role model as well as a source of new ideas.

The Lab that fell to earth

The concept of an advanced research lab has critics. *Wired Magazine*, previously one of Media Lab's biggest fans, recently published a critical article entitled *The Lab that Fell to Earth*. Describing it as "research institute-cum-futuristic romper room," author Brendan Koerner listed a series of concerns: a decline in funding, academic schisms, over-expansion in Massachusetts, Ireland and India, plus a lingering sense of being scientifically lightweight.

Critics highlight other approaches to innovation. For example, Cisco grew its technology base by acquiring smart, innovative small companies. However, that approach is harder now that the venture-funded, start-up market has stalled. Dell takes another approach. It spends a scant one per cent of its sales revenue on R&D, preferring to let suppliers, including Intel and Microsoft, carry the weight.

The most damning argument against R&D spending is the fate of Xerox's famous Palo Alto Research Centre (PARC). In the seventies and eighties, PARC laid the foundations for computing as we know it: windows, mice, networking, object-oriented programming, laser printers, desktop publishing, encryption and security. Despite this early lead, Xerox is not Microsoft, Intel and Dell rolled into one. In fact, it's not even in the PC business. In other words, PARC created a lot of value, but not for Xerox. Why?

There are lots of explanations but, fundamentally, Xerox chose not to be in that business. It was not a failure of research but one of commercialisation and strategy. It is far harder for an incumbent business to

Ten technology trends for the next decade

1 **More speed, storage and bandwidth** All three will continue to grow at their existing trend rate or faster.
2 **All the data you can eat** More and more data will be available. Within a decade, all human knowledge could be online.
3 **Embedded sensors** Expect everyday life to be as well-instrumented as a 747, although you probably won't be aware of it. Also, your phone will know where it is thanks to GPS and it'll even know which pocket you put it into.
4 **Ubiquitous networking** Low-cost, single chip web servers combined with wireless networking technology embedded in TVs, phones, light switches perhaps even the humble tin of beans.
5 **Distributed computing** Processing power will be embedded in clothes, sprayed on walls, printed in books as tiny particles called "smart dust."

6 **Natural interfaces** Handwriting and voice recognition and interfaces linked to the objects around us.
7 **Smarter computers** We won't see true artificial intelligence but computers will increasingly exhibit common sense. "Transfer all the files I'll need for my Washington trip," will be a reasonable command.
8 **Smart search** Google will respond to a question like "show me a picture of someone who is happy" or "what's the best recipe for a really spicy curry."
9 **Proactive computing** Your terminal, be it a PDA, phone or computer, will be an autonomous agent working towards general objectives that you set, like a personal assistant or researcher.
10 **Augmented reality** PDAs with magic windows, car head-up displays and eyeglass screens will project digital information onto images of the real world.

"MIT HAS GENERATED NEARLY HALF AS MANY SPIN-OFFS AS THE UK'S UNIVERSITY SECTOR"

up sticks and try something completely new. It is the innovator's major dilemma.

Microsoft used to have a poor reputation for innovation. Historically, they have not pioneered markets but exploited them using long-term product evolution. The first versions of Windows, Word and Excel were not as strong as the rivals they later eclipsed.

Recently, however, Microsoft has changed strategy. The company devotes at least $4bn a year (15 per cent of its sales) to R&D. This is the same proportion as Intel. It has also set up a network of "labettes" to pursue longer-term R&D.

Somewhere in Cambridge, England

Andrew Herbert is managing director responsible for a team of over 170 people in one such lab in Cambridge, England. They focus on three main areas of research: networking and distributed computing; security, privacy and integrity; and machine learning, perception and language recognition.

"What people learned from PARC was how to do research in a commercial context and this lab works with the same ethos. Chucking things over the fence doesn't work. It just piles up and rots," says Herbert. Microsoft's antidote is a crack team of "program managers" who liaise between the product and research groups. The title is chosen deliberately. Inside Microsoft, program managers are the wranglers who manage product teams and ship products. They bridge the worlds of technology, politics and business and are Microsoft's most experienced and able leaders. For example, one of its program managers in Cambridge was responsible for the first six versions of Microsoft Office – Microsoft's equivalent of Steven Spielberg.

The emphasis is on liaison not marriage. Chris Bishop, a senior researcher in the Cambridge lab says, "One thing Microsoft does really well is separate the research and product groups. Both report to Bill Gates and that is the first place they meet." This allows an open, academic approach to research that is not tied to short-term product needs. "In many ways, we have more freedom than an academic because there is no teaching requirement or grant proposals."

Despite the academic aspirations, Microsoft's competitiveness has rubbed off as well. Herbert says "we're measured by our track record not our promises." Success is something that earns academic plaudits and puts "a smile on Bill Gates' face."

The future ain't what it used to be

Previous DTI reports have demonstrated a clear correlation between research, development intensity and corporate, national prosperity. R&D spending leads to growing sales, greater productivity and higher shareholder returns. In short, innovation pays.

Microsoft views its research projects as a stock portfolio. There are some safe bets that respond to clear, tactical needs, some longer shots and others that are just "way out there," with potential for a huge pay off or complete failure. Part of its charter is "to make sure that Microsoft and its products have a future." They aren't looking at the next generation of products but the generation after that.

This forward search for disruptive technologies is characteristic of successful businesses. Attitudes to innovation are also different in various countries. MIT as a whole "has generated nearly half as many entrepreneurial spin-offs as the entire UK university sector," according to a 1998 report by McKinsey.

As BT's Steve Whittaker says: "One of the things that's broken is getting from innovation to execution. A lot of companies have got rid of R&D and the venture community is dead. How do we get back to a sensible, rational, investment strategy?" Long-range research is not the whole answer, but for companies like BT, Microsoft and Ordnance Survey it is an increasingly important part of the answer.

Criticism of the Media Lab rests on debates about personalities and economics but the model has proven itself over the years. Only time will tell if the projects it is currently pursuing will be as influential as those it championed in the past. In one sense, scientific experiments are equally valid and equally informative if they fail. If Media Lab doesn't invent the future, someone else will. "I don't believe in the good old days," says Walter Bender, "we have to keep moving forward."

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