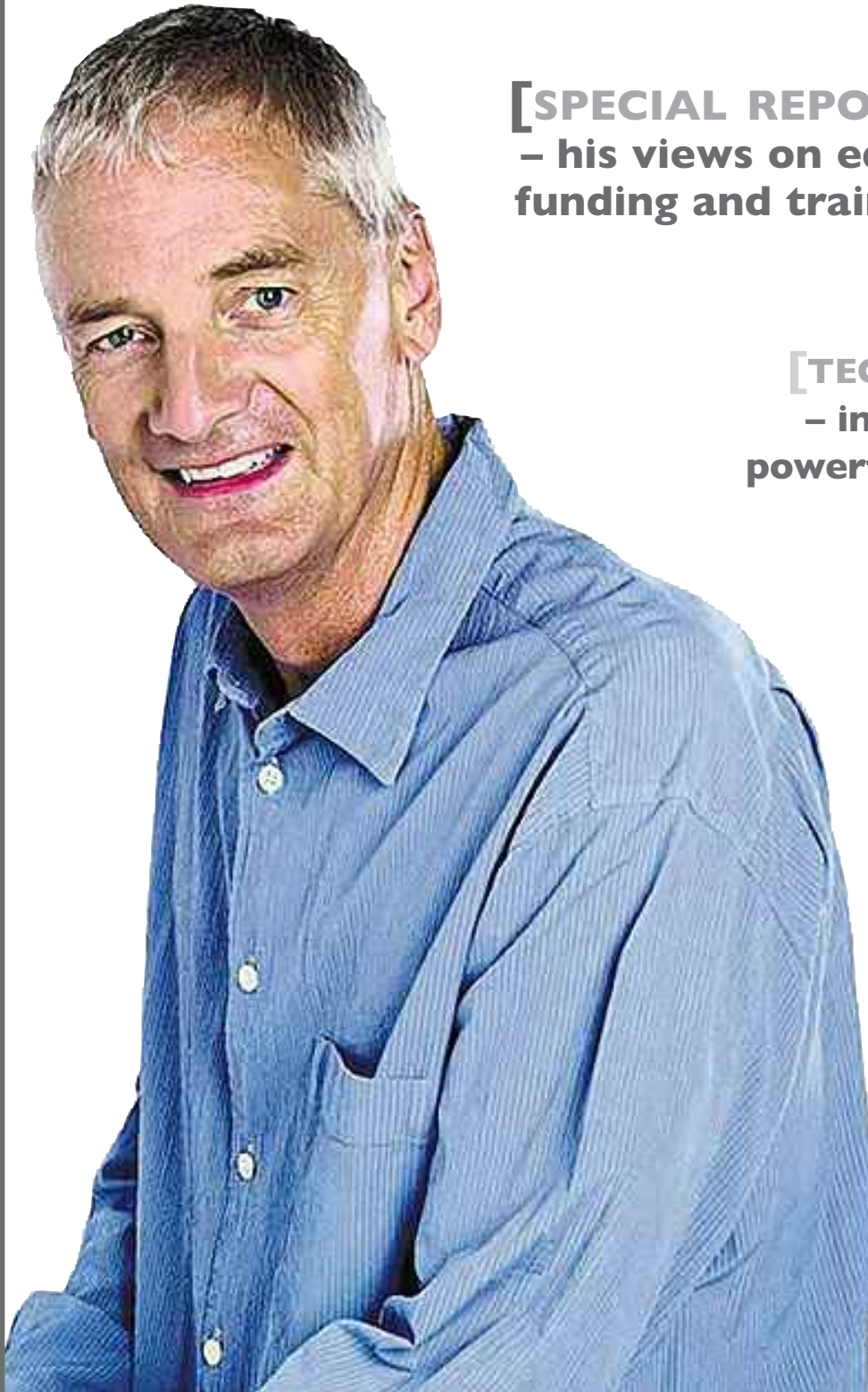


Innoventionique

FROM INNOVATION TO MARKETPLACE 2011 [ISSUE2]



[SPECIAL REPORT: JAMES DYSON]
– his views on education, technology,
funding and training by Denise Smith

[TECHNOLOGY TRANSFER]
– industrial designers make
powerful allies for universities

[ENTREPRENEURS]
– what is traction, and
why is it important?

[INNOVATION]
– frustration can lead
to opportunities

[INVESTORS]
– what do angel
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contents

2011 [ISSUE2]

4 [news & events]

Queen's Award for Enterprise... funding guide... paper computers... R&D grant

8 [letters]

Your views and opinions.

10 [comment]

It's time to turn those ideas into high growth businesses, says Cally Robson.

11 [comment]

Design thinkers make powerful allies for universities, says David Maddison.

12 [james dyson]

Denise Smith examines the inventor's views on... everything.

15 [investors]

What do business angel investors really want, asks Chris Clegg.

16 [entrepreneurs]

What is traction, asks Alan Gleeson.

17 [entrepreneurs]

Pitching for investor funding means selling yourself, says Sal Pinto.

18 [innovation]

Frustration is a key source of opportunities says Roger La Salle.

19 [opportunities]

Attractive business opportunity listings.

21 [Q&A]

The first ever inventor-in-residence for The British Library tells all.



18



21

editorial

ONE OF the dozens of aphorisms attributed to Peter Drucker, that remarkably prolific authority on business management, entrepreneurship, innovation and technology, was: "the best way to predict the future is to create it" – a clarion call to entrepreneurs and innovators if ever there was one.

Yet creating the future is as hard as it has ever been. Having a great idea is one thing, but having the talent, ability, knowledge and sheer stamina to carry that initial idea through to a presence in the market still defeats all but the most able, committed and persistent.

Which brings us to the crux of the matter: access to the funding of, and investment in, innovative ideas, businesses, products and processes, without which any future will be diminished, or worse.

Fulfilling well-structured business plans for potentially successful concepts, services, start-ups, spin-outs and the like demand realistic levels of funding and investment, yet this deceptively simple premise remains the highest barrier to success any business can face. (Most of us don't even know who make the funding decisions, let alone the level of relevant expertise that enables them to do so.)

This issue of *Innoventique* includes a thought-provoking article on technology transfer by Industrial Designer David Maddison, who reveals that all his work with Isis (Oxford University's commercialisation arm) was in effect aimed at raising funding.

And a pertinent, if rather chilling, tale is recounted in Denise Smith's cover story on James Dyson: if his bank manager had not personally secured the £600,000 he needed for tooling, the Dyson business wouldn't exist.

The best way to create the future is to fund it properly. ©

"...if James Dyson's bank manager had not personally secured the £600,000 he needed for tooling, his business would not exist..."

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2011 [ISSUE 2]

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news & events

INTERACTIVE "PAPER" COMPUTER

New PaperPhone shows flexible future for smartphones, computers and tablet devices

THE WORLD's first interactive paper computer is set to revolutionise the world of computing.

A smartphone prototype, called PaperPhone, is best described as a flexible iPhone. It does everything a smartphone does, like store books, play music or make phone calls, but its display consists of a 9.5cm diagonal thin-film flexible e-Ink display.

The flexible form of the display makes it much more portable than any current mobile computer: it will shape with your pocket.

"This is the future. Everything is going to look and feel like this within five years," says creator Roel Vertegaal, director of Queen's University Human Media Lab, Ontario. "This computer looks, feels, and operates like a small sheet of interactive paper. You interact

PaperPhone is best described as a flexible iPhone. Human Media Lab has also devised Snaplet, a wristband computer.



© QUEEN'S UNIVERSITY, ONTARIO

with it by bending it into a cell phone, flipping the corner to turn pages, or writing on it with a pen. When users are reading, they don't feel like they're holding a sheet of glass or metal."

The invention heralds a new generation of computers that are super lightweight, thin-film and flexible. They use no power when nobody is interacting with them. Being able to store and interact with documents on larger versions of these light, flexible computers means offices will no

longer require paper or printers.

"Everything can be stored digitally and you can place these computers on top of each other just like a stack of paper, or throw them around the desk," says Dr. Vertegaal.

Dr Vertegaal unveiled his paper computer at the Computer Human Interaction conference in Vancouver in May, where the group also demonstrated a thin-film wristband computer called Snaplet. ©

Source: R&D Magazine

THE Shell LiveWIRE Business Library contains a wide range of free articles, tools and resources that will help you start or run your own business, or signpost you to the relevant information elsewhere. Articles include networking tips from Alex Mitchell of the Institute of Directors, marketing and promotion (how to spread the word about your business), and Top 10 PR Tips for effective media relations. ©

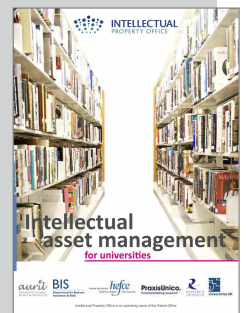
● www.shell-livewire.org/business-library

[intellectual asset management for universities]

The IPO (UK Intellectual Property Office) has launched a strategy guide, *Intellectual Asset Management for Universities*, as a new advice and information tool to help universities manage and maximise the value of their intellectual property. UK university-owned IP worth £84m was generated in 2009/10.

Phil Clare, who helped to write the guide, said universities need to think more deeply about their strategy for managing their intellectual assets and how best to invest in knowledge exchange.

The new guide includes contributions from Research Councils UK, HEFCE, Universities UK, PraxisUnico and the Association for University Research and Industry Links. © ● www.ipo.gov.uk



TECHNOLOGY SECTOR FUNDING GUIDE

FUNDMAP provides easy navigation to the grants and funding available to businesses in the UK technology sector, including:

- **Research** Funding associated with investigation or inquiry that may lead to the creation or use of Intellectual Property.
- **Product Development** Funding or support associated with the development of a new product or service.
- **Commercialisation** Funding or support associated with the development and growth of a company, its employees or its assets.
- **Company Growth** Funding or support associated with the related processes when taking a product or service to market, or increasing sales. ©

For further information, visit www.fundmap.co.uk

WHAT'S ON, WHAT'S UP AND WHAT'S OUT THERE

“...success is not final, failure is not fatal: it is the courage to continue that counts..”

NEW GRANT FOR R&D

Hundreds of applications for grants up to £250,000 already received from start-ups and SMEs

THE new “always open” Grant for R&D programme launched by the Technology Strategy Board in April has already attracted hundreds of applications from small and medium-sized companies seeking research and development funding.

Grants range from £25,000 to £250,000. Three types of grant are available: proof of market, proof of concept, and development of prototype.



Grant for R&D offers funding to help SMEs engage in projects from which successful new products, processes and services could emerge, stimulating future economic growth. The new scheme replaces the programme previously offered by

regional development agencies.

All pre start-ups, start-ups, and small and medium-sized businesses from all sectors across the UK may apply for the Grant for R&D by visiting:

<http://www.innovateuk.org/deliveringinnovation/grant-for-research-and-development.ashx>



THE QUEEN'S AWARD FOR ENTERPRISE

THE ENTRY deadline for The Queen's Awards for Enterprise 2012, the UK's most prestigious awards for recognising business success and innovation, is Monday 31 October. There are three categories of award for businesses: innovation, international trade and sustainable development.

In addition to the business awards, the Queen's Award for Enterprise Promotion is intended to recognise individuals who make outstanding contributions to enterprise culture in the UK.

Awards will be announced on the Queen's birthday, 21 April, 2012. ©

● Visit: www.businesslink.gov.uk/bdotg/action/detail?itemId=1084954027&type=RESOURCES

UK Business Angel activity falls

BUSINESS angels have long been recognised as an important source of finance for entrepreneurial businesses, particularly at their start-up and early growth stages, where the amounts required are too small to be economic for venture capital funds to invest.

A sharp reduction in early stage venture capital and bank lending in 2009-10 meant increased demand for angel funding, requiring them to provide greater financial support to their existing investee companies. But there were few exits, leaving angels with little money to recycle into new companies,

according to the second Annual Report on the Business Angel Market in the United Kingdom: 2009/10.

Business angels in the UK put in a total of £60.5m, a decline of 3.7 per cent compared with 2008-09, but 'good' investment opportunities did not find it any harder to raise finance from business angels.

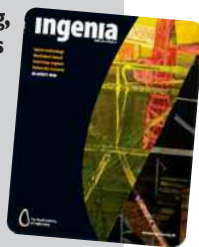
British Business Angels Association networks received 9,640 business plans, of which 764 were put before their investors. ©

To download the report, visit www.bis.gov.uk
Source: Science|Business

[read all about it]

INGENIA is the informative quarterly magazine of The Royal Academy of Engineering. It is aimed at all those with an interest in engineering, whether you work in business and industry, the financial community, academia or government. Complex or technical engineering issues are explained for the non-specialist and confusing jargon is kept to a minimum.

● www.ingenia.org.uk



CORPORATE REPUTATION: Managing Opportunities and Threats. Edited by Ronald J. Burke, Graeme Martin and Cary L. Cooper.

The contributors bring imagination, depth and range to this complex and intangible subject. This book contains academic content along with practical contributions, developed by those serving as consultants or working in organisations specialising in corporate reputation and its management or recovery. ©

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LIGHTER, STRONGER STEEL, CREATED IN A FLASH

Self-taught metallurgist Gary Cola's new process stuns researchers

A DETROIT entrepreneur has invented a heat treatment that makes steel 7 per cent stronger than any steel on record – in less than 10 seconds. Now trademarked as Flash Bainite, the steel appears to be stronger and more shock-absorbing than titanium alloys.

The process that inventor Gary Cola – a self-taught metallurgist – demonstrated shouldn't have worked. Rollers at his proprietary lab setup carry steel sheets through flames as hot as 1100 degrees Celsius and then into a cooling liquid bath. Most steels are heat-treated at around 900 degrees Celsius for a few hours, while others are heated at similar temperatures for days. But Cola's entire process took less than 10 seconds.

Now the entrepreneur is working with researchers at Ohio State University to better understand the science behind the new treatment, called flash processing. What they discover may hold the key to making cars and military vehicles lighter, stronger and more fuel-efficient.

Other researchers are working to carry over the lessons into welding engineering, where it is hoped to solve the

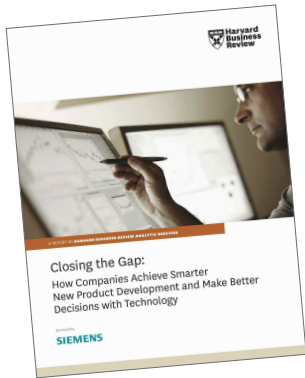
BEND IT, SHAPE IT
An example of Gary Cola's Flash Bainite. The self-taught metallurgist is now working with Ohio State University to understand the science behind the treatment, called flash processing.



problem of heat-induced weakening during welding. High-strength steel often weakens just outside the weld joint where the alloy has been heated and cooled. Bringing the speed of Cola's method to welding might minimise the damage to adjacent areas and reduce the weakening. ©

Source: *Materials Science and Technology, R&D Magazine*

CLOSING THE INNOVATION GAP: HARVARD BUSINESS REVIEW REPORT



Companies are expanding their commitment to the research and development of products over the next two years despite the challenges that come with economic recovery, according to a new study from Harvard Business Review Analytic Services. Half of the companies surveyed said increasing the rate of innovation is a top priority in 2011.

In "Closing the Gap: How Companies Achieve Smarter New

Product Development and Make Better Decisions with Technology", global executives say that gains in their business will come from increasing efficiency, deploying information technology to help identify promising ideas, and tracking and evaluating R&D projects.

With a trend toward 'open innovation', not only are sales, marketing, finance and operations now collaborating with R&D, but so are partners, suppliers, customers and competitors.

However, this expansive approach has increased the complexity of R&D processes and increased concerns about protection of intellectual property rights. ©

EASY-OPEN LIDS: A NEW TWIST TO AN OLD TALE

AN innovation that makes opening glass jars easier has been introduced by Duerr's, the independent jam maker, across their range of jams and marmalades nationwide following a successful trial in Morrisons stores.

Surveys indicate that 22 per cent of participants could not open a jar with a normal lid, increasing to 40 per cent for women over 50 years of age. The easy-open mechanism, developed by Crown Holdings Inc, a world leader in metal packaging, is in two parts: a

central panel sealed to the jar by vacuum, and an outer ring screwed onto the jar's moulded glass thread.

The outer ring acts as a tool to break the vacuum: twisting it loosens the lid by sliding the central panel away from the jar, thus breaking the seal. ©

In a Sheffield Hallam University survey, 90 per cent of purchasers said the easy-open lid (right) would influence their purchasing decision. More than a fifth of adults couldn't open traditional jam jar lids.



THE LOCAL OPTION

Many local and regional authorities provide grants or loan finance to new and/or established businesses unable to obtain finance from banks.

They also provide tailored support through seminars, workshops and/or one-to-one coaching to assist businesses in understanding the finance-raising process and lenders' requirements; identifying suitable sources of finance; improving the quality of your business proposition and effectively presenting it to potential funders.

Some also offer follow-up mentoring designed to help businesses attain sustainable growth.

ALAN HORNE, MANCHESTER

START-UPS: DON'T SEEK INVESTMENT

There is another view with regard to business funding. Some analysts and economists believe that most start-ups should not seek investment from angel investors or venture capitalists, but instead concentrate on growing the business as best they can using other means (called "bootstrapping" in the US).

While raising capital from investor funding may be the right option for some start-ups, these instances, they argue, are in the minority. They offer three main reasons for this:

1. You lose control of your start-up's destiny. (While you should welcome the advice of seasoned investors, you need to retain the option of rejecting it.)

2. Fundraising consumes energy, takes months and sometimes years, and for the vast majority will be unsuccessful regardless of how good the business or investor pitch is. Far better to spend that time and energy growing the start-up business.

3. You retain a bigger share of the profits later on. Start-up investment taken when it isn't really needed is simply a short-term boost that is ultimately replaced by long-term pain.

There are many start-ups who have successfully bootstrapped their way to millions. In "Bootstrap to Billions", business author Dileep Rao documents the journeys of entrepreneurs who have built huge companies from scratch.

JOHN RATLEY, BRIGHTON

editor@...**TO THE EDITOR**

*We welcome readers' opinions,
which should be emailed to:
editor@innoventique.com*

Submissions may be edited for publication.

**WHERE'S THE BEEF?**

I hear a lot about innovation and research, and about how successful outcomes from spinout companies and new products and services are crucial for our national growth and economic future.

But what I don't hear is anyone spelling out in a clear, articulate and transparent manner what and where these successful outcomes are, how they were achieved, by whom, for how much and with whose help.

Success is not one-dimensional; achieving it is only the beginning of the story. What I (and many others, I imagine) want to know is how those unsung companies we've never heard of but with turnovers in the millions achieved what they did.

The Innoventique Report on Vince Cable (see Issue 1) banded huge sums around, but nobody appears willing or able to provide a meaningful analysis of who actually receives such funds, or why, or how that helped the recipients and the economy.

People in the UK may be very inventive, but most are exceptionally poor at public relations and marketing their message. Is it too much to suggest that creating a national business website, where the details of all start-ups in the UK are logged –

including any publicly-funded investment, and each one's subsequent success (or failure) – would be a start?

ALISON MOORE, BRISTOL

STREET INNOVATION

I think the government is making a fundamental error in supporting high-tech research-based spinout companies to the almost total exclusion of everyone else. Although collaboration with key partners is a crucial element of any innovative enterprise, there is no evidence that university-supported business start-ups are more successful than those from the private sector – indeed, the opposite could be said to be the case.

Unfortunately, although universities are now forced to claim – some would say compete against – private sector expertise in order to receive public funding, they remain coy about publicising the outcomes of it.

Massachusetts Institute of Technology (MIT) is the most successful research-based university in the world for commercialising research, yet even their success rate is only around the 10 per cent mark. UK universities stand at not much more than one-tenth of that figure, even though they preselect the projects they want to pursue from a long list of equally worthy cases.

A far more cost-effective route to success would be for universities to do the education and research (that is why they exist, after all), while the government diverts those otherwise wasted billions into the private sector, for *them* to commercialise the results (that is why the private sector exists).

Richard Branson started his empire selling records in a one-room shop above Oxford Street in London, not a so-called innovation centre, hub or cluster. ©

DON KIRWAN, STOCKPORT

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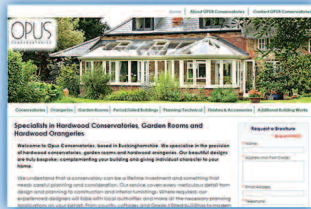
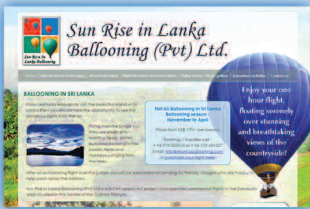


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THE IDEAS REVOLUTION

Leave Wallace and Grommit behind, says Cally Robson. It's time to turn ideas into high growth

HAVE YOU noticed how everyone is talking about “innovative” businesses with “high growth potential” these days? It's a topic that is going to become increasingly significant as we see government shifting enterprise support in this direction, investors grumbling at a lack of real opportunities and weary business start-ups returning to the drawing board.

The government definition of a high-growth business is a start-up that achieves a turnover of £0.5m within three years, or an established business that maintains growth in turnover above 20 per cent for three years, while an investor will tell you that the only real measure of a business is in its profits.

Whatever the measure, is it healthy to look at innovation in this way? Should our ideas powerhouses, from research institutions to lone innovators, be excused from this kind of scrutiny of their new concepts? Or is a new world dawning in which the spirit of exploration and invention is outshone by a taste for enterprise?

Over the last decade I've worked with all kinds of ideas people, both male and female, from garden shed inventors to opportunistic entrepreneurs, and reviewed possibly thousands of ideas and business propositions at every stage of development.

Sadly, I've also witnessed the depressingly low success rates for the transformation of ideas into sustainable ventures. More than 99 per cent of concepts that get off the ground still fail to deliver a return on development costs, let alone realise the riches envisaged by their originators.

And it's not lack of investment or support or “getting the word out” that causes the high failure rates. Most often it's simply that the ideas, even the great ones, are not focused on the commercial and market mechanisms that can bring them to life. There's a pervasive belief that good ideas should be exempt from earning their living.

[time to search for scalable solutions]

In the UK we pride ourselves on being a nation of inventors and influencers. With the ingenuity of an industrial revolution behind us,



Cally Robson is a portfolio director with the Oxfordshire Innovation & Growth Team, a support programme for innovative high-growth businesses, and Founder of 'She's Ingenious!' – a web resource and network for women developing new products and inventions. www.shesingenious.org

internationally renowned academic institutions and a design sensitivity that puts us on today's world stage, we have good reason to be proud of this identity.

But now it's time to get off our high horse and get on with competing for a place in the global future. While our world needs fresh thinking and innovation like never before, it also needs the spotlight and resources to be focused on solving real problems – not as designers and inventors see them, but as customers and end-users perceive them to be. Whether it is to social or commercial gain, it's time for the exploration of new ideas to make way for the hunt for scalable solutions.

A focus on high-growth potential enterprise doesn't only stand to restore our faltering economy or head off planetary meltdown. The national psyche needs a shot in the arm too. It's time to leave Wallace and Grommit behind and embrace innovation for the new millennium. ©

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[potential high growth start-ups checklist]

Here's the checklist I run through when I assess a new business proposition:

THE TEAM ● Led with drive and commitment.

- Sharing a common bond and complementary skills.
- Sector experience and good market knowledge.

THE MARKET ● A concept aimed at a specific audience comprising a substantial market.

- An industry/market that is growing, where innovation has stagnated or where users are hungry for new offerings.
- A clear and unfulfilled opportunity in the marketplace.

INTELLECTUAL PROPERTY ● A uniquely different offering with an aspect of intellectual property that can be built on to protect ownership and fend off competition.

- An intellectual property strategy and timeline mapped out with key development milestones.

ATTITUDE ● Speedily making connections, assessing situations and people.

- A can-do approach that surmounts obstacles.
- A cooperative approach towards partnering and working with others.
- The ability to handle day-to-day details, developments and operations while retaining the big picture and ultimate goals.
- A desire to always question, listen and learn.

BUSINESS ● Not a single-product or -service concept, and a business that will grow.

- A willingness to get to grip with financials, even if at a basic level.
- A strong desire for business success, not just to get an idea to market.
- The courage, commitment and confidence to aim high and grow big. ©

POWERFUL ALLIES

Design thinkers offer universities a helping hand in convincing investors, says David Maddison

HAVING been in the product design and development business for 30-odd years, it still surprises me to realise that until about five years ago I knew so little about the technology transfer business in the UK, especially as a good deal of my work is directly related to new science that has been licensed or 'spun out' from the commercialisation arms of universities.

Many commentators believe that new high technology start-up businesses will be our economic salvation. Technology transfer represents a major source of new businesses and I believe the voice of experienced industrial design and design thinking should be a more important element in this process.

We have fantastic research institutions and brilliant scientists working in wide-ranging fields. Did you know that the UK has been responsible for more than 40 per cent of the inventions that have been significant to Japanese industry over the last 50 years? This is an indicator of just how good we are at new science and how important it is to maximise this talent to the benefit of UK Plc.

[design thinking in tech transfer]


In 2006 I was invited to undertake a major role in an experiment at Isis, Oxford University's commercialisation arm, to mentor research groups working there. It was felt that access to commercial design and development experience could be beneficial in the process of moving science from laboratory to licence deal or spin-out. A *Dragons' Den*-type process for professors was used to select research teams, and for the next 12 months I met them once a month to advise on their project issues.

If I had to distil the huge range of tech transfer tasks into a single overarching theme, that theme would be "raising funding". Whether developing a technology further, forming a spin-out company or licensing the technology, you need funding – which inevitably means convincing people that your intellectual property (IP) has value. I did many different things at Oxford, from helping to set up creative events to discussing technical end-user issues, but it was all aimed at raising funding.

One of the projects was a new and



"...the voice of experienced industrial design and design thinking should be a more important element in technology transfer..."

 **Facebook discussion?**
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David Maddison is managing director of Maddison industrial design and development consultancy, and is designer-in-residence at University of Manchester.
www.maddison.co.uk

amazing technology for an energy "Smart Meter". This was intended to be a spin-out company and there was the inevitable need to raise funding, in this case via utility companies and/or venture capital money.

Although the technology was convincing, there was a lack of clarity in the business plan over what form it would take and how it would be used by industrial and domestic end-users. Without this clarity it was difficult for potential investors to fully appreciate the appeal (and therefore the value) of the new technology, which made them less likely to invest. To remedy this we researched possible solutions and visualised scenarios that would easily allow people to understand its true value – a small but important addition to the business plan.

This is one example of many, but our findings at Oxford were that design thinking, although a small part of the overall process, is complementary to technology transfer and can significantly assist in raising the value of IP and optimising the commercialisation pathway.

In 2010, I was appointed designer-in-residence at UMIP, the commercialisation arm of Manchester University. This company is at the forefront of technology transfer in the UK and on average produces three to four spin-out companies and 86 licence deals per annum. We have a different model at Manchester to make design experience available to the tech transfer office and the research teams they work with. However, the findings are equally positive and the role of designer-in-residence has since been extended to related organisations and teams.

Industrial Designers are the "street kids" of innovation. We know how to get things done quickly and economically and how to challenge innovation boundaries. We have amazing connections from finance to materials and – possibly most importantly – have experience and understanding of the end-user.

We don't always analyse our processes, but this different design perspective represents a valuable input to tech transfer. I believe we have shown that including experienced design thinking at the early stages adds to IP value and enables more technologies to succeed. ©

A 300-ACRE estate in Gloucestershire, a chateau in France, a town house in Chelsea, and an estimated fortune of £1bn; not a bad return for a man whose invention was turned down by every major manufacturer in the UK.

Spending 15 years and 5,127 prototypes to create the Dual Cyclone bagless vacuum cleaner – early versions incorporated cardboard and duct tape – Sir James Dyson embodies a dogged determination (or stubbornness, as his wife Deirdre would put it) to get things right.

Sir James feels that the future success of Britain's high-tech innovators depends on entrepreneurs getting the necessary financial backing they need to start and grow their companies. Sir James says that if his bank manager hadn't pressed his case personally, securing the £600,000 he needed for tooling, the Dyson business wouldn't exist.

He has strong opinions on the subject of innovation and is clear about where he thinks encouragement should begin. "Backing British engineering and inspiring new talent must start with the Government." He is keen to see large schemes such as high-speed rail and nuclear power get moving. "Big projects inspire engineers and universities," Sir James says. "Instead we get bogged down with endless reports and bickering."

Despite this comment he has written his own 60-page report (commissioned by the Conservative party before the 2010 election) to document his opinion on how to rebuild the manufacturing and technology industries in Britain and help pull the nation out of recession.

Ingenious Britain calls for a change in culture to "reawaken Britain's inventiveness" and move the focus of the economy away from financial services and back to manufacturing.

Sir James sees funding as one of the key issues and has called for an overhaul of the tax system. "Too often, UK investors are reluctant to take a punt on technology, science or engineering," he says. He feels that banks often shy away from innovation.

"...we produce 22,000 engineers a year,

So the answer, he suggests, is to encourage angel investment. "We need an approach that relies on the good judgement and sharp eyes of already successful entrepreneurs and technology developers."

One of Sir James' recommendations is to refocus R&D tax credits (tax relief claimed by SMEs) on high-tech businesses, small companies and start-ups. "Research and development is risky and a long-term investment," he says. "The cash-flow pressures facing many start-ups hinder R&D, suffocating good ideas before they become world-beating inventions."

He suggested that when the public purse could afford it, the R&D tax credit should be increased from 140 per cent to 200 per cent. The coalition government agreed; the increase was implemented in the April 2011 Budget, with a further rise to 225 per cent next year. "This will have a substantial impact on company investment decisions and send a far-reaching signal to both national and international companies about the government's belief in science and technology," says Sir James.

A second recommendation threw the spotlight on the Enterprise Investment Scheme (EIS). Sir James said he wanted those who backed high-tech, R&D-intensive businesses to benefit more, with EIS relief to them rising from 20 per cent to 30 per cent. Again, this year's Budget saw chancellor George Osborne almost double the maximum investment to £1m.

Sir James saw this as another positive move. He felt once again that the right signals were being sent to investors and the financial community about "the value the UK attaches to high-tech companies."

Another key issue for Sir James is education, about which he has been quite vocal, including a number of recommendations in his report. His view is that the system isn't producing enough young people with the right skills and feels that students consider subjects like science,

the billionaire design engineer views technology, funding, education and training

but half of them go to the city to be bankers...”

engineering and maths as hard work and boring. He casts the blame for this outlook far and wide, citing businesses, the business press and even TV shows for the decline in the numbers of youngsters going into the industry.

“Britain produces 22,000 engineers a year, but half of them go to the city to be bankers. Thirteen per cent of teenage girls want to go into science, but they all want to be pathologists because of the CSI programmes,” he laments. Sir James feels there is a lot of pressure on young people to avoid engineering because it is considered too “geeky”. “We need to change perceptions and inspire,” he says.

So starting in schools, Sir James is keen to see the combined science GCSE split back into separate exams. “Children like challenges,” he says. “They like experiments and they’re not getting enough of them.” He recalls the Design Technology course made compulsory by the Thatcher Government, but subsequently down-graded by a later administration to non-compulsory, leading to fewer students, especially girls, taking it.

“We need a curriculum that excites young people about the role they could play in the future,” says Sir James. Doing this requires good teachers and more of them. To address the serious shortage, he advocates better pay for science, technology and maths teachers, thus attracting higher-calibre staff.

Although heartened by the news that there has been an increase in the numbers of students taking science and maths A-levels, the challenge is then encouraging them to study those subjects at university. Sir James suggests the dearth of graduates in this area is creating a major skills gap and having a direct impact on the country’s ability to create world-beating technology.

One of his recommendations is to provide engineering undergraduates with industry-sponsored scholarships of £2,000 each. Another is to raise the salaries of post-graduate research students from £13,000 to ...continued on page 14



James Dyson continued

£23,000 per year. When it comes to post-graduate work, Sir James feels British students are being “priced out” of research posts. “They’re too indebted to stay on,” he says. “As a result the universities are filled with foreign students who then take the expertise back to our competitors.”

Sir James isn’t just an armchair critic; he uses his own money to encourage the innovators of the future. The James Dyson Foundation was set up in 2002 to support design and engineering education, including the James Dyson Award, a student design award running in 18 countries.

In 2010, the Foundation donated £5m to the Royal College of Art (RCA) to help fund a new building in London. The Dyson Building will provide a lecture theatre, gallery space, studios and 40 business incubator units, and should open for business in 2012.

The Foundation has also added £1m to its



THE JAMES DYSON AWARD 2011 for student designers, engineers and problem solvers.

THE BRIEF: design something that solves a problem.

THE PRIZE: £10,000 to you and £10,000 to your university department.

Entries close Tuesday 2 August.

For more information, visit:
www.jamesdysonaward.org

fund to encourage young engineers to continue to post-graduate level. From September, four £25,000 bursaries per year will be available to students at Bristol, Bath, Corpus Christi Cambridge, and Imperial College London until 2013. Five top design universities, including the RCA and Loughborough, will benefit from £60,000 to support specific projects that show technical excellence and innovation. ©

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Industrial Designer Sir James Dyson is founder of Dyson Ltd and is best known as inventor of the Dual Cyclone bagless vacuum cleaner. www.dyson.co.uk



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WHAT DO ANGEL INVESTORS LOOK FOR?

Business Angel investors use many criteria by which to judge opportunities, says Chris Clegg

THE MOST COMMON COMPLAINT Business Angel investors make is that there is a dearth of good investible opportunities with good management out there, even though they search high and low for them. But what are the criteria by which Business Angels make their judgments about investing?

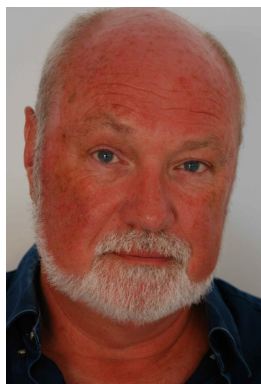
The really simple answer is outlined in the opening paragraph: excellent business ideas allied to excellent management. However, Angel investors don't like taking risks and will need to consider the answers to a number of other key questions before they go any further.

[inventions]

When is a brilliant invention also a 'good' idea?

● **Size, Scale and Scope:** Does the idea address solving other people's real problems, or is it a clever solution looking for a problem to solve? If it is original, can it be made and sold profitably, has it a market, and how big is the market? Will everyone need one frequently and regularly, or will it sell only occasionally to specialists? Could it become a range or a series, or is it a one-off?

● **Timing:** Have you heard about the man who invented the gas meter? Brilliant idea, but he died in poverty – he invented it decades



Chris Clegg founded Equity Entrepreneur to promote better understanding of Business Angel activity.

He founded microFunding to help inventors and business managers gain commercial success from their skills while providing investors with good quality deals.

A specialist in raising risk finance for early-stage businesses with Beer & Partners for 16 years, Chris has been a finance director and founded a number of successful financial services companies. He is the publisher of Innoventique.

before domestic gas was commercially available. His problem was poor timing.

● **Evolution or revolution:** Does it simply modify or improve something already in use so as to make it easier, or cheaper, or quicker, or better? Or, even though it is brilliant, will it mean that consumers will have to change their habits and manufacturers change their production lines? How brilliant would it have to be for this to happen?

● **Protection:** Have others had the same idea? If so, exploiting it could be a struggle, and even if it succeeds the others might claim a slice of the pie. Could the idea be challenged because it is similar to something else? (That 'something else' need not be on the market – large companies have hundreds of thousands of patented inventions defensively stored away to protect sales of their other products.)

[management]

What do Angels mean when they say they're "looking for excellent management"? Again, there are four criteria by which potential management will be judged:

● **Experience:** What's their track record: have they done anything like it (or anything at all) before? How big was it?

● **Capability:** Can they actually get it done? Can they grow a business? Can they get others to join them?

● **Knowledge:** What do they know, and how relevant is it? What expertise do they have in industry, sales and marketing or technology. Do they fundamentally understand what is required? Are they known and respected by others in the field?

● **Character:** Even if all else is perfectly fine, is the Principal honest? Is s/he a wheeler-dealer trying it on with anyone, or "cutting you in on a closed deal" – and cutting out others? How does this bode for the future?

The solution to all of this is for inventors to find good managers to run their great business ideas and find funding. The microFunding Exchange (left) helps them achieve this, greatly increasing the chances of converting their ideas into serious business success. ©

[the microFunding Exchange]

THE microFunding Exchange helps fund great business ideas and turn them into serious business successes. It gives inventors the chance to:

- Realise their ideas at minimum-to-zero personal cost.
- Have their ideas protected and exploited by skilled and experienced business managers with no need of ongoing personal involvement.
- Have them paid for (mostly) and managed by others while retaining a big stake in their success without committing more time or money.
- Continue to do what they do best: come up with more great ideas.

Having sector-experienced managers run their projects gives inventors the best chance of profit. The manager (who has sole responsibility for the success of the project and ensuing business) clarifies and proves the concept and other aspects including suppliers, costs, deadlines and other criteria. The manager also has sole discretion over personnel, strategy and implementation.

By identifying winners at little cost early on, the microFunding process – which can be accessed through any of the many Partner websites – gives both inventors and investors the chance of real rewards at reduced risk. ©

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THE IMPORTANCE OF TRACTION

Alan Gleeson asks: Why is traction an important concept for entrepreneurs to be familiar with?

WHILE THE WORD “traction” is typically associated with tyres and slippery driving conditions, its use is increasingly common in entrepreneurship and venture capital circles.

The typical entrepreneurship journey moves through various stages, from idea conception to business plan to execution and then to growth (or failure). For most the journey is challenging, not least because they need to perform many activities simultaneously while always being conscious that they may soon run out of money.

While sound planning can help with the former, early stage investment is often used to fund this investment gap and it is at this point that the concept of traction often comes up.

Investors need to carefully balance risk and return and will be very familiar with the harsh realities of early stage investment. As a result they will be trawling through the evidence provided (often a business plan) to assess whether or not they perceive a commercially viable business opportunity exists.

Early stage investment is often a leap of faith, relying on the assumptions contained within the business plan. Traction is essentially momentum and progress, best exemplified by customer adaption and sales. If entrepreneurs can demonstrate that they have gained some traction, the risk is reducing for investors, as factual evidence will always trump assumptions, projections and wild conjecture.

[evidence of demand]

The most persuasive evidence that can be provided to demonstrate a business is worth investing in is “evidence of demand”. If this demand is translated into sales there is irrefutable evidence that the start-up has traction.

In terms of the “traction hierarchy”, active users and letters of intent probably fall into the next tier below real sales. While growing visitor numbers to a website was once a good barometer of the potential of a business, it is no longer considered a valuable proxy. These visitors have to convert to sales and, once again, the focus returns to the one piece of evidence that trumps all others – real sales.

One of the problems entrepreneurs face is that they can often focus on the wrong things.



“...the easiest way to identify potential reasons for a lack of traction is by talking to prospects and customers...”

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Alan Gleeson is general manager of Palo Alto Software, creators of Business Plan Pro. He holds an MBA from Oxford University and an MSc from University College, Cork.
www.paloalto.com/uk

For example, they often have an excessive product orientation, focusing predominantly on product design without really addressing wider concepts such as addressable market size, customer acquisition costs and sales forecasts.

However, not all entrepreneurs embrace the principles of business planning, and even those that do may not have a strong focus on ensuring all activities are strongly correlated with the core aim of gaining traction.

Entrepreneurs need to concentrate efforts on the area of product/market fit. The primary role of an entrepreneur is to repeat and test assumptions and hypotheses they have made regarding customer behaviour and demand until they find a commercially viable business model.

[customer acquisition]

The easiest way to gain traction is to produce something fantastic that solves a problem for a target group, and to back it up with effective marketing to that audience. If the solution to this problem is compelling it is likely to gain traction.

Customer acquisition is the clearest signal that traction is being gained, but the amount of traction required depends on the risk appetite of the investor. The more traction there is the greater the ability to dictate terms when seeking external investment.

There are numerous reasons for not gaining traction – lack of awareness being one of the most common problems. Competition is increasingly intense and has shifted from being within a market sector to pan-industry competition for people’s attention. This issue is of particular relevance to internet-based start-ups who assume that “if I build it they will come” applies. People may not be aware of the product, and if this is the case, marketing efforts need to be intensified.

For others, it may simply be that it does not meet their needs, or there may be switching costs preventing them from trialling it. The easiest way to identify potential reasons for a lack of traction is by talking to prospects and customers. The last thing to do is continue along the same path without understanding why adaption rates are not at the level they need to be. Perhaps there’s a need to pivot what is being done, or consider a Plan B. ©

MAKING YOUR MARK AS A PRESENTER

Pitching for funding means selling your ideas, your business plans – and yourself, says Sal Pinto

A MAJOR STEP in getting funding is the presentation to investors. This is a typical selling pitch and it's here that the problems start.

Unfortunately, very few people know how to present well. It's not that presenters are stupid – far from it. It's just that they have never been trained properly. Often, the presenter isn't even aware of the problem.

So what is the solution? We have to engage much more deeply with our audiences. And we have to increase the persuasiveness, effectiveness and credibility of ourselves as presenters, and of our message.

We can start by looking at some great speakers such as Martin Luther King, Winston Churchill, Barack Obama or Steve Jobs. Once we begin to understand their techniques we can begin to apply them ourselves.

[how do they do it?]

Great speakers use simple language and powerful rhetoric. They weave their message following a structure and they use words that create vivid images in our minds. As well as getting the words right, they master acting techniques to control their tone of voice and convey confident body language. It comes as no surprise that they practise acting techniques, use voice coaches and employ speechwriters.

Effective and persuasive presenters have to combine acting techniques together with content techniques. That doesn't mean that you have to go to acting school, nor that you need a degree in rhetoric. But it does mean that you have to master key skills in both areas to be more persuasive. There's no doubt that getting professional help with the right sort of training will yield the best results in the shortest time.

A camcorder and tripod are great investments. You can observe yourself in action. It may not be a pleasant thing seeing yourself, warts and all, but it will definitely help you to improve. It can help cure annoying mannerisms, fidgeting, and those "ums", "errs" and "you knows" that pepper nervous communications.

Most importantly of all, it helps develop self-awareness, and that's a big benefit. ©



BORED TO TEARS If this is the impression your presentation makes on potential investors, you need to improve your persuasiveness, effectiveness and credibility.

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Sal Pinto is managing director of EPS Comms Limited. For more information, visit www.eps-comms.co.uk or email sal-pinto@eps-comms.co.uk

[making an impact]

Here are some useful tips for making your next presentation more impactful:

- **START OUT** with a short, interesting story that describes a real-life situation or problem. Your business idea or product should provide ideas.
- **Follow** by establishing your credibility and/or relevant qualifications relating to the needs/solution/problem.
- **Remove** all those slides consisting entirely of words or bullet points. Use real visual aids, such as charts, diagrams, pictures, objects, etc.
- **Don't end** your presentation by saying, "Thank you, any questions?" By all means encourage questions, but end by re-stating the benefits. If you want your audience to take action, state it clearly. If you want funding or are making a sales pitch, ask for the business. ©

FRUSTRATION IS OPPORTUNITY

[innovation]

Too many people fail to exploit frustration and “widespreadness”, says Roger La Salle

PRODUCTS and services generally exist because they meet a need that is tangible and can be readily enunciated, although in some cases that need may be artificially created through clever advertising and brand positioning.

Apart from such “created” needs, one of the major sources of real opportunity is a widespread activity combined with an observed frustration. Inventors, entrepreneurs and innovators are very good at spotting opportunities, perhaps because they can identify the frustrations and resolve the underlying problem more readily.

However, one essential ingredient that underpins many a successful opportunity – and an ingredient that too many people too often fail to appreciate – is its span, or “widespreadness”. There is little point in solving a problem for a single person involved in a lone occupation. What is needed is an occupation that is widespread – because this is where widespread opportunities exist.

[tracking a widespread activity]

With this in mind we can create an opportunity matrix (right), comprising a grid noting the fundamentals that underpin an opportunity on the vertical axis, and a number of catalysts arranged on the horizontal axis (one being frustration). The result is a simple and structured way of identifying an opportunity.

Simply by utilising the XY elements of the opportunity matrix, one need only identify an activity that is undertaken on a widespread basis, then track the people undertaking that activity, listen to them and document the incidences of frustration (Industrial Designers call it “the user journey”).

This is rigorous, easy to do, and almost foolproof in the outcomes it produces.

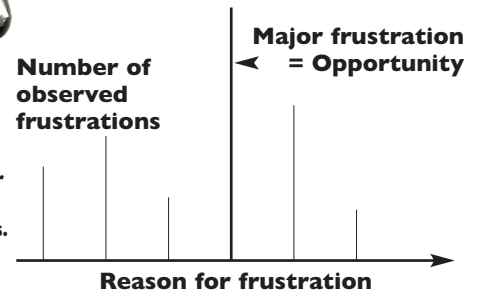
The point is to identify any widespread activity, to track the people involved and capture and plot the frustrations. You can do this with your staff, with people using your products or services, with customers and any other target audience you choose. ©

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Author and speaker on innovation, opportunity and business development, Roger La Salle is creator of the Matrix Thinking™ technique, used in more than 26 countries. Former CEO of the Innovation Centre of Victoria, Australia and director of successful technology start-ups, he was appointed to the Chair of Innovation at Queens University Belfast in 2005. www.matrixthinking.com

Right: Example of a simple scatter graph for plotting the results of observations made when tracking a target group over a period of time. Vertical axis: the number of frustrations. Horizontal axis: the reasons for them.



	Catalyst		Frustration		
Seed					
Widespread			X		

OPPORTUNITY MATRIX

[case study]

A TRACKING exercise was undertaken in order to gain a complete understanding of the frustrations encountered by electrical contractors installing overhead downlighters.

Before tracking began, it was assumed that the task of actually cutting the correctly-sized holes into the ceilings, and then wiring the lights in awkward overhead positions, would turn out to be the problems.

In fact, by tracking the contractors the real problem was found to be in exactly calculating and measuring the positions of the ceiling holes. Once these positions were known it was a simple and relatively quick task to actually cut the holes and fit the lights.

The outcome was the opportunity to devise new instruments to facilitate easy calculation and measurement of the holes' positions, resulting in a 40 per cent reduction in installation time – just one example of implementing a structured opportunity search by tracking a widespread activity. ©

opportunities

LISTINGS

To view further opportunities, visit our website at the foot of the page.

■ Advanced Golf scoring and analysis tool

SPORTS & LEISURE/GIFTS & ACCESSORIES

This golf accessory adds a new dimension to scoring and provides complete game analysis across clubs, players, courses and times, giving players invaluable feedback.

Advanced Golf also combines unique features with a number of existing systems to create a clever and ingeniously simple players' aid. Nothing like it currently exists.

The invention's principals have considerable business experience but insufficient time or funding to exploit this idea with the thoroughness it deserves.

■ BIN RAM handheld wheelie bin compactor

WASTE DISPOSAL & RECYCLING

Overflowing wheelie bins are not only unsightly, they also constitute a local health hazard by attracting vermin, flies and foraging animals. And they are inherently inefficient because 50 per cent of the rubbish they contain is comprised of air.

BIN RAM is a lightweight, cheap and portable trash compactor that doubles the capacity of a wheelie bin by compacting air out of the rubbish contained within it.

More than 200 local councils in the UK now operate fortnightly bin collections, with others likely to follow suit as pressure to meet strict EU recycling and

landfill targets intensifies.

This places pressure on the estimated 20 million households with 240ltr wheelie bins to manage their waste disposal and recycling more efficiently, or face penalties for not doing so.

■ Continuous-charge wind turbine

GREEN ENERGY

Inherently inefficient wind turbine designs utilise only a fraction of the wind required to power them, whether they use wind to drive sails or make use of pressure differences to move aerodynamic blades.

This device produces charge in the lightest of winds, and continues to charge even after the wind stops; it is also unaffected by turbulence, gusting or changes in wind direction.

Smaller models can be manufactured to produce a mobile charge for electric cars and other vehicles, while larger versions can be used to power individual buildings, including bank arrays that contribute to the Grid.

The inspiration for the device came to the inventor, a retired science teacher, from observation of the problems associated with wind-generated energy.

■ Ellis joist hanger

BUILDING & CONSTRUCTION

The Ellis joist hanger enables professional house builders and DIY enthusiasts alike to

[ABSTRACT] The innovations listed below are shown here for the information of business people and entrepreneurs seeking attractive business opportunities; they are not seeking investment.

An investor interested in any opportunity is asked to add a note to that effect on the microFunding® Exchange, as such information is much more likely to attract a competent business person to run the business. Such a business person may, in due course, seek investment through the appropriate authorised channels.

erect arrays of joists quickly and efficiently, creating strong and permanent structures in different situations without the need for nails, screws, straps or woodworking skills.

The patented system works by mounting pre-formed arrays of hangers that cut joists can simply be offered up to and slotted in. It is estimated that the use of Ellis joist hangers enables a faster building programme generating a saving of one week over an average house build, while the reduced numbers of tradesmen required improves site safety.

Versatile and adaptable, different designs of hangers cover all situations, including decking, fencing, sheds and extensions. Prototypes are available.

■ FT3 extreme sports exercise machine

SPORTS & LEISURE

The FT3 was originally intended as a training aid when its inventor – an experienced ski instructor and grade one coach who experienced the 1998 Olympiad and has an excellent understanding of the sport and fitness industry – was recovering from an upper body injury.

A gym prototype produced for a 6-month consumer test has not only generated a host of glowing testimonials but also a ski-slope full of confident first-time skiers. Production

expertise is required to help a distributor willing to take the machines to market.

■ GearTurbine

GLOBAL ENERGY / TRANSPORT

This innovative power plant/engine project employs inflow thermodynamic rotary technology for improved power-generating efficiency in all applications.

It was inspired by a circular dynamic motion system used in ancient Egypt that has been translated into modern materials, new technology and technical know-how.

■ Hazard alert+record system

HEALTH AND SAFETY/RISK MANAGEMENT

ELECTRONICS/LEGAL

The food and drink retail industry spends over £500m a year on easily-avoided slipping and tripping accident compensation, and supermarkets and others are often sued following instore accidents because evidence of their efforts to take reasonable steps to keep visitors safe is inadequate.

The Hazard alert+record system replaces current hand-written manuscript records with a technology that identifies ...continued on page 20

Visit the website below to view further opportunities

■ Innoventique provides a forum for promoting the commercialisation of innovation. It is not authorised to arrange transactions or circulate offer documents under FSMA guidelines and cannot advise on the merits or risks of investment. Nothing in this magazine should be construed as an investment advertisement.

OPPORTUNITIES continued

[opportunities]

spillage hazards, promotes early responses, records safety inspections, logs data, etc. It also resolves other problems in the cleaning management process.

The system's inventor is a Fellow of the Institute of Legal Executives who has prosecuted and defended personal injury compensation claims for 15 years.

■ Instant Buttons

CLOTHING & FASHION ACCESSORIES

Invented by the director of a successful SME, this product enables the instantaneous pressure-mounted replacement of a button onto a fabric surface, attaining a permanent fixing without special knowledge or skill or requiring a needle and thread.

Useful for keeping in the car, home or handbag, outlets could include newspaper kiosks, stores, supermarkets, etc.

■ Novel double-acting two-stroke outboard motor

MARINE TRANSPORT/ENGINEERING

Engine manufacturers still produce Total Oil Loss two-stroke outboard motors, even though they don't comply with ever more stringent worldwide health and environmental legislation: exhaust fumes and oil loss pollute waterways and are carcinogenic.

This novel design from a qualified engineer eliminates oil loss, replacing technology that is already 130 years old and adding green credentials and compliance to a product

entering a \$100bn market in North America alone.

■ PPS Primero Polymer Systems

BUILDING/CONSTRUCTION

High density particle board, which most kitchen and bathroom unit manufacturers use, is a non-recyclable material that becomes weak with age and disintegrates when wet.

PPS is a waterproof, recyclable, lightweight, strong, mass-produced and affordable replacement for chipboard use in kitchen and bathroom units, enabling a modern, easy-to-fit and quicker-to-install alternative for the 27 million kitchens and bathrooms in the UK.

The product's inventor has owned a building company for 35 years and

been associated with the kitchen and bathroom industry for 25 years.

■ Stain-removal machine

CONSUMER/HOME/CLEANING PRODUCTS

The invention team, led by a surgical consultant, has developed and tested several concepts and has now created a market-ready prototype of their stain-removal technology.

It comprises a quick and effective method of removing stains from carpets, textiles, soft furnishings and furniture that can be applied to both the dry-cleaning and household sectors, and was inspired by the inventor's observations during surgery, when he realised how to quickly and simply clean a piece of stained cotton. ©

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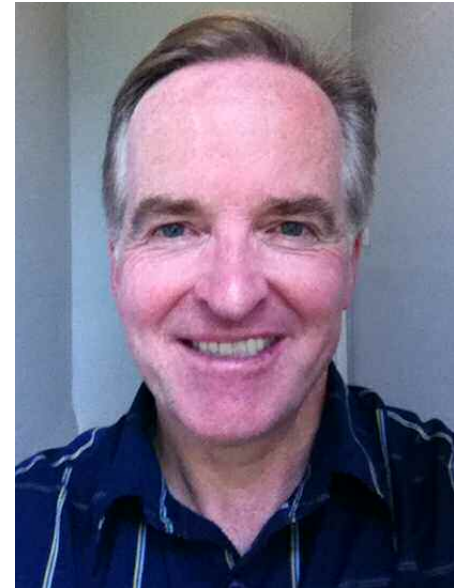
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ADVICE ON R&D, FUNDING AND CREATING REALISTIC
MARKETING AND BUSINESS STRATEGIES

[Q&A] mark sheahan



which inventor or business person do you most admire?

Richard Branson, for his mastery of branding, PR and stealth delegation.

who most influenced you?

My business mentor, the late Clive Hurkus, who was CEO of a plastic injection moulding company. Every inventor or businessman needs a mentor when they first start out.

what was your big break?

Successfully negotiating a licensing deal on Squeezeopen™ and an evaluation and option agreement on Popi™ packaging closure technologies with a major Japanese manufacturer. The deal took 18 months to finalise, and everyone here was saying that I didn't stand a chance as Japanese caps and closures are cutting edge.

how often does your work take you overseas?

A great bi-product of being an inventor with global aspirations is the opportunity to travel: I've visited 23 countries in three-and-a-half years.

what are you proudest of?

Being the first inventor-in-residence at the British Library Business & IP Centre. I have mentored over five hundred people on their 'Ask an expert' programme.

which invention do you wish you had thought of?

Bakelite – or perhaps I should say polyoxybenzylmethylenglycolanhydride. This early plastic was a manufacturing revolution. Modern plastics get a bad press sometimes, but have changed the world for the better in so many ways.

what would most improve business and innovation?

More collaboration, by avoiding fixed fees and exploring joint ventures and profit-sharing methods to encourage

innovation. And introducing more schemes to reward those who innovate.

when do you get your best ideas?

I co-author the Inventors' Inbox column for *Engineering and Technology* magazine; we have to invent something new every month and write about it. My trick is to immerse myself in a subject, look at related patents, trade press and the internet etc, and then forget all about it and let my subconscious go away and work on it. An hour, day or week later, an idea pops into my head.

what key lessons do inventors need to learn?

To be successful, focus on one idea (two at most), and become good at business: the idea alone is not enough.

what trait do you think best personifies you?

I am an irrational optimist, a useful trait if you are an inventor.

what was your worst moment?

One large potential licensee cost me time and money by getting me to jump through hoops for six months before pulling out; I believe they just wanted my input, not a licence. I now ask for evaluation and option agreements, with non-refundable payments upfront.

what single thing would most improve your life?

Like everyone else, financial continuity.

what is the most important lesson life has taught you?

Never go down a road you cannot get back from, treat people the way you want to be treated yourself and always go with your gut feelings.

what's in the pipeline?

Launching an easy-opening child-resistant container, and a rat trap that uses no power or poison and resets itself. ©

[ABSTRACT]

Mark Sheahan is managing director of Compgen Limited (licensing technology) and proprietor of Plasgen Design (product design and media) and Putdown Traps. Other directorships include Ambosco Ltd (IT development), DK Watersavers (irrigation) and Institute of Patentees and Inventors (inventor support).

“...the licensing deal took 18 months to finalise... everyone here was saying I didn't stand a chance because the Japanese market is so cutting edge...”

The first ever inventor-in-residence for The British Library, Mark Sheahan is president of the Institute of Patentees and Inventors, a fellow of the Royal Society of Arts and vice chairman of Croydon Round Table of Inventors. Mark also sits on the advisory council for Ideas21.