Advanced Materials Society
Global Corporate Venturing

in partnership with:
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London Environmental Investment Forum

Venturing in the Advanced Materials and Manufacturing Nexus

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Advanced Materials Society
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in partnership with:
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London Environmental Investment Forum
Connecting capital with environmental innovation

Sponsorship & Membership Options 2016

Sponsor: £9,995

- Society membership for up to six staff members for 12 months
- Quarterly Advanced Materials Report including deal data
- Full page advertisement or article in Advanced Materials Report x 4 (worth £6,000)
- Branding on GCV Materials Society website and at events as a sponsor. High profile to the ecosystem to attract start-ups and deal flow
- One panel or panel moderator position at a Society meeting (Spring or Autumn)
- Up to three free tickets to two Society meetings (Spring and Autumn) in London (worth £3,000)
- 50% off either a Single or Group to the GCV Symposium and gala dinner, London, May 24-25, 2016 or the GCVI Summit in Sonoma, California Jan 27-28, 2016 (tickets worth up to £4,000).
- Up to three free tickets to the annual Advanced Materials Society Dinner (worth £750) in London, May 25th 2016
- Access to GCV Analytics (www.gcvanalytics.com) for up to 2 people for 12 months (worth £6,000)
- Discount code of 20% off GCV events e.g. additional tickets for the Symposium, Summit or GCV Materials conferences
- Three month subscription to Global Corporate Venturing (worth £600) for two staff members

Corporate membership: £3,995

- Society membership for up to four staff members for 12 months (worth £3,750)
- Quarterly Advanced Materials Report including deal data
- Company listed as a corporate member on the Society website and in event materials – Showing support for the ecosystem and raising your profile
- Up to two free tickets to two Society Meetings (Spring and Autumn) in London (worth £2,000)
- 50% off a Single ticket to the GCV Symposium and gala dinner, London, May 24-25, 2016 or the GCVI Summit in Sonoma, California, Jan 27-28, 2016 (ticket worth up to £2,000)
- Up to two free tickets to the annual Advanced Materials Society Dinner (worth £500)
- Discount code of 15% off GCV events e.g. additional tickets for the Symposium, Summit or GCV Materials conference

Individual membership: £750

- Society membership for one person for 12 months
- Quarterly Advanced Materials Report including deal data
- One free ticket to two Society Meetings (Spring and Autumn) in London (worth £1,000)
- One free ticket to the annual Advanced Materials Society Dinner (worth £250) in London, May 25th, 2015
- Discount code of 10% off GCV events e.g. additional tickets for the Symposium, Summit or GCV Materials conferences

(two individual members for £1,400)

Note: Prices subject to VAT where applicable

Global Corporate Venturing

About The GCV Advanced Materials Society

The GCV Advanced Materials Society is organised by Global Corporate Venturing in partnership with the London Environmental Investment Forum (LEIF). The Society convenes and connects the world's leading innovators and venture professionals to review the latest technology and investment trends, to network and share ideas, whilst also granting preferential access to advanced materials deal data and special reports.

Why Advanced Materials?

The world's largest businesses require advanced materials if they're to survive and prosper. Improving industrial processes, making existing products better and devising new products all need such innovation.

Research conducted by GCV and LEIF shows that the rising number of companies with open innovation and corporate venture capital (CVC) units (and nearly half of the Fortune 100 now do have these units) are increasingly active in advanced materials commercialisation and investing.

About Global Corporate Venturing

Global Corporate Venturing is the dedicated news and data service for the in-house venture capital units of businesses. With a magazine, newsletter, online news site and networking events, GCV brings together all the key players in the industry for discussion, analysis and commentary to keep you in the know.

About the London Environmental Investment Forum (LEIF)

LEIF is a capital-raising and business development consultancy focused on advanced materials and clean-tech that does three things:

- We help companies find customers, investors and partners
- We help investors find investments
- We secure media coverage in influential magazines and newspapers

Clear and strong communication is at the heart of our service offering.

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Tom Whitehouse

Chairman, LEIF

Contributing Editor, Global Corporate Venturing

Tom Whitehouse is LEIF's founder and chairman. He has advised leading environmental investment and technology businesses for the last ten years, raising over $60m for start-ups and investment companies since being authorised by the UK's Financial Conduct Authority in 2008. Flagship clients include Impax Asset Management, Veolia, Airbus Group, the London Stock Exchange and Mountain Cleantech. Before working in the environmental technology sector, Tom was a journalist. From 1997-1999 he was Moscow correspondent for The Guardian and from 1991-1997 he was a reporter and producer for the BBC World Service, based in Prague and Moscow. He is a Contributing Editor at Global Corporate Venturing, for whom he writes the Clean Deal, a monthly column on environmental and advanced materials venturing.

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Editor, Global Corporate Venturing

Toby Lewis is the editor of Global Corporate Venturing. He was previously news editor at Private Equity News, part of Dow Jones, and was published regularly in The Wall Street Journal, Dow Jones Newswires, Financial News, Private Equity News and across the Dow Jones network. He has also written as a freelancer for top trade titles including Legal Week, Global Pensions, Real Deals and numerous other titles. Before moving to Private Equity News, he was a reporter at Private Equity International.

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Foreword

This is our second report on advanced materials venturing. It follows our second conference. Our first focused on new fusions in advanced materials venturing; on collaboration among diverse industries that share the need for the same advanced materials innovation.

In this second report we focus on the interaction between materials and manufacturing. This is where some of the most exciting innovation lies and where advanced materials get to successful commercialisation. Materials innovation without manufacturing is R&D. There's nothing wrong with R&D, but it's not what corporate and financial VCs want to invest in.

If you ask the man on the street in Britain to name an advanced material, you'd probably get some blank stares and one or two mentions of graphene. The Advanced Materials Society is certainly interested in graphene and other wonder materials, and we're impatient to see how they can be manufactured into commercial products. But we're just as interested in mundane materials, whose functionality is being advanced through manufacturing innovation.

Here's just one example from the companies mentioned in this report; Picodeon, a Finnish nano-tech business, has a patented advanced manufacturing technique which transforms the functionality of separators in batteries, thereby extending their power and/or reducing their size. The separator material is relatively mundane – a plastic – but the manufacturing technique is highly advanced; it turns plastic into an advanced material.

"The Innovate UK advanced materials programme will continue to focus on accelerating the journey from materials discovery to exploitation in industry. It will continue its support of businesses with innovative ideas for the application of novel materials and help high potential companies take their technologies to market."

Ben Walsh, Lead Technologist – Advanced Materials at Innovate UK

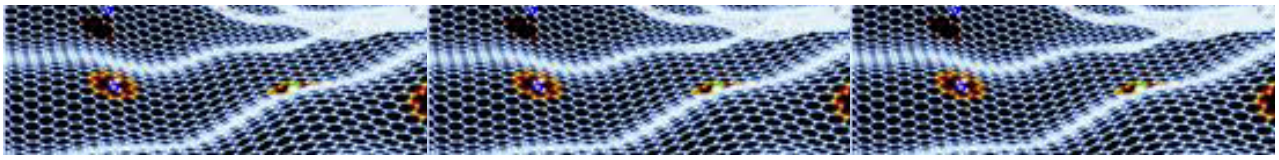
Conventional/established materials should not be overlooked in the overall advanced material supply chain. We need a secure and reliable source of metals such as nickel, cobalt and manganese to fuel the next generation of batteries. So we're delighted to have a mining company, Clean TeQ Holdings Ltd, which is quoted on the Australian stock exchange, as one of our sponsors. In addition to these metals for batteries, Clean TeQ is preparing to mine the world's largest source of Scandium, a rare metal which, when combined with aluminium, makes it corrosion-resistant, weldable and stronger; attributes desperately sought by transportation and other industries. Clean TeQ's chairman Sam Riggall is interviewed from page 22.

Commercialising materials innovation is very difficult and requires deep-pocketed, patient and determined financial and corporate venture capital. It also requires governmental support.

> "Scandium is an extraordinary metal when alloyed with aluminium. It makes aluminium stronger, and therefore lighter for a given application; more resistant to corrosion, thereby avoiding the need for surface treatment; and weldable using conventional welding methods."
>
> *Sam Riggall, Chairman, Clean TeQ Holdings Ltd*

Enso Ventures, whose investment manager Kirill Mudryy is interviewed from page 26, is a rare example (in Europe at least) of an early stage advanced material investment company backed by a single limited partner with a belief in the value of fundamental science and technology. Enso is sponsoring the Advanced Materials Society as it seeks to source new investments and find new co-investors. "We're actively seeking like-minded investors who can complement our knowledge," says Kirill.

Innovate UK, the government's innovation agency, provides vital funding for UK start-ups at their earliest stages to accelerate "the journey from materials discovery to exploitation". Ben Walsh, Innovate's lead advanced materials technologist, and his colleagues Lien Ngo and Bruce Colley set out their strategy to de-risk start-ups for corporate and financial VCs from page 12. Innovate UK is sponsoring us in order to "grow and diversify [its] pool of potential investors." Investors should turn to page 14 to review seven of the start-up businesses that Innovate has backed, and contact, Bruce, Lien and Ben to find out more about their exciting pipeline of advanced materials innovation ripe for investment and commercialisation.



We mustn't overlook the challenges of recruitment and of IP protection in the pursuit of materials technology advancement. Chris Reichhelm, MD of London-based specialist recruitment consultant Peloton Advisors, encourages advanced materials start-ups to recruit leaders with "the ability to transform technology … into a form that is suitable for a customer's requirement." From page 16, he urges business to put human capital at the centre of their growth plans. We thank Peloton for its sponsorship.

Finally, we thank Sean Murphy, James Baillieu and their colleagues at Norton Rose Fulbright for hosting the launch of this report and for hosting several of our conferences and dinners.

Tom Whitehouse, LEIF

Toby Lewis, Global Corporate Venturing

"At heart we still believe that Moore's Law has not changed. It's just being re-defined … We're seeing an encouraging impatience from the ICT industry to adopt advanced materials because that's how they get a competitive advantage in very competitive markets."

Kirill Mudryy, Investment Manager, Enso Ventures

"Over the past ten years many of the obstacles that have traditionally been in our way have been removed, placing [the UK] closer than ever to a new era of value realisation."

Chris Reichhelm, MD, Peloton Advisors

Innovate UK

Best of British advanced materials

About Innovate UK

Innovate UK is the UK's innovation's agency. It works with people, companies and partner organisations to find and drive the science and technology innovations that will grow the UK economy – delivering productivity, new jobs and exports, keeping the UK globally competitive in the race for future prosperity.

Since 2007, Innovate UK has invested over £1.5 billion in innovation, matched by a further £1.5 billion in partner and business funding. It has helped more than 5,000 innovative companies in projects estimated to add £7.5 billion to the UK economy and create an average of 7 jobs per company it has worked with.

Sponsored by the Department for Business, Innovation & Skills, Innovate UK works by: determining which science and technology developments will drive future economic growth; meeting UK innovators with great ideas; funding the strongest opportunities; connecting innovators with the right partners they need to succeed; and helping them launch, build and grow successful businesses.

Innovate UK's five-point plan for economic growth includes:

- Accelerating UK economic growth by nurturing small high-growth potential firms in key market sectors, helping them to become high-growth mid-sized companies with strong productivity and export success;
- Building on innovation excellence through the UK, investing locally in areas of strength
- Developing Catapults within a national innovation network, to provide access to cutting edge technologies, encourage inward investment and enable technical advances in existing businesses
- Working with the research community and across government to turn scientific excellence into economic impact, and deliver results through innovation; and
- Evolving our funding models by exploring ways to help public funding go further and work harder, while continuing to deliver impact from innovation.

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De-risking advanced materials start-ups for Corporate VCs and other investors

As part of its advanced materials strategy, Innovate UK works with corporate and financial VCs to connect the UK advanced materials community to potential investors. We are partnering with the GCV Advanced Materials Society to grow and diversify our pool of potential investors. We see this as an opportunity to showcase the high growth potential businesses that we are proud to have supported.

> "We are partnering with the GCV Advanced Materials Society to grow and diversify our pool of potential investors."
>
> *Walsh, Ngo, Colley*

The companies presented overleaf are UK advanced materials businesses that have received funding from Innovate UK to take their ideas from concept to commercialisation. This funding has allowed them to de-risk their technology and they are now looking for follow-on support to take their technology to market.

Because the technological concepts have been proven, investors, partners and customers can be more confident in working with them. These companies reflect the inspiring range and diversity of the UK advanced materials landscape, from technologies enabling flexible electronics to lightweight structures for aerospace and satellite applications.

The advanced materials programme at Innovate UK is part of the enabling technologies priority area and reflects the UK government's emphasis on materials and manufacturing as one of its 'Eight Great Technologies'. From 2012 to 2015, Innovate UK's Advanced Materials strategy focused on:

- Materials for sustainability: lightweight materials, materials with reduced environmental impact through-life, nanotechnology-enabled materials, substitutes for less sustainable or restricted materials;
- Materials for energy: materials for cheaper and more efficient energy storage and management, materials for energy transmission and distribution to minimise power and thermal loss, and materials for high-durability energy generation at small and large scale, including clean technologies, catalysts and fuel cell technologies, and photovoltaics;
- And materials for high value markets: integration of new materials, coatings and electronics, materials for aggressive environments with extremes of temperature, corrosion, erosion or stress, and biomaterials.

Recent programmes delivered by the advanced materials team at Innovate UK include the Materials & Manufacturing Launchpad, support for nanotechnology and graphene such as "Realising the Graphene Revolution" and "Advancing the Commercial Applications of Graphene" competitions, and a feasibility studies competition for "Materials for Demanding Environments."

> "We see this as an opportunity to showcase the high growth potential businesses that we are proud to have supported."
>
> *Walsh, Ngo, Colley*

The Materials & Manufacturing Launchpad is based in Daresbury and Runcorn Heath in the North West. The Launchpad aimed to accelerate innovative projects towards commercial success and stimulate the development of the cluster by encouraging high-growth companies to engage with it. These projects are now finishing or have finished recently, many with successful technical outcomes. These companies are now seeking further private investment to take their businesses forward. More information on these companies can be found at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/363024/Launchpad_directory_-_materials_manufacturing_North_West_2013.pdf

The Innovate UK Advanced Materials programme will continue to focus on accelerating the journey from materials discovery to exploitation in industry. It will continue its support of businesses with innovative ideas for the application of novel materials and help high potential companies take their technologies to market.

If you are interested in learning more about the businesses we've supported or how we work with investors, please contact us. We also invite you to have a look at our GrowthShowcase (www.growthshowcase.com), which features investment-ready companies which have been validated and de-risked through a rigorous selection process. In addition, information on winning projects of Innovate UK competitions are available publicly and businesses are encouraged to network, present their projects and pitch for further support at events such as the annual Collaboration Nation, which targets small and micro UK companies, and the nationwide Venturefest events. Please contact us to learn more about these and other events.

> "The Innovate UK Advanced Materials programme will continue to focus on accelerating the journey from materials discovery to exploitation in industry."
>
> *Walsh, Ngo, Colley*

Seven British early stage advanced material businesses backed by Innovate UK

"These companies reflect the inspiring range and diversity of the UK advanced materials landscape, from technologies enabling flexible electronics to lightweight structures for aerospace and satellite applications."

Lien Ngo, Technologist- Advanced Materials at Innovate UK

DZP Technologies
Delivering printed electronics innovation

DZP Technologies Limited: Meeting urgent materials needs of new industries

www.dzptechnologies.com

CEO/MD: Dr Zlatka Stoeva

About: Technology development company working in the emerging field of printed and plastic electronics

Markets: Consumer electronics, medical devices and healthcare, renewable energy, automotive and aerospace, and others

econic technologies
Polymers from CO2

Econic Technologies: Turning waste carbon dioxide into a benefit for business and our planet

www.econic-technologies.com

CEO/MD: Dr Rowena Sellens

About: Enabling manufacturers to make a whole new generation of everyday plastics – for use in cars, mattresses and running shoes

Markets: Automotive, building & construction, furniture & bedding, footwear & apparel, appliances

Exxelis: Micro-patterned films for illumination and branding

www.exxelis.com

CEO/MD: Dr Navin Suyal

About: UV 'printed' optical microstructures, which manipulate light, built on high refractive index materials & processes

Markets: laptops, mobile handsets and flat panel TVs, and others

Flexenable: Bringing every surface to life

www.flexenable.com

CEO/MD: Chuck Milligan

About: Organic Thin Film Transistor (OTFT) array technology, flexible and low cost platform for "bringing surfaces to life" with displays and sensors

Markets: Digital signage, automotive and aerospace, wearables, unbreakable mobile devices

Marine Biopolymers: Unlocking seaweed's hidden treasures

www.marinebiopolymers.co.uk

CEO/MD: Sandy Dobbie

About: Marine biotech business manufacturing alginate (an established, high value biopolymer) bioactive polymers, nanocellulose and anti-oxidants from seaweed

Markets: Food, pharmaceuticals, personal care, industrial

Oxford Advanced Surfaces: Making the coating and bonding of advanced materials simple

www.oxfordsurfaces.com

CEO/MD: Philip Spinks

About: Adhesion promotion, fibre sizing and surface wetting solutions for advanced materials to enable innovation and enhance product performance

Markets: Automotive, aerospace, marine, industrial, defence, energy

Tisics: Designing, developing and manufacturing lightweight titanium and aluminium composites

www.tisics.co.uk

CEO/MD: Stephen Kyle-Henney

About: Designing composite components to achieve the performance required in demanding conditions

Markets: Aerospace, space, automotive and others

PELOTON ADVISORS

The missing link: Overcoming Britain's failure to commercialise advanced materials

Chris Reichhelm, MD, Peloton Advisors

> "This 'missing link' is the ability to transform technology – our innovations – into a form that is suitable for a customer's requirement."
>
> *Chris Reichhelm, MD Peloton Advisors*

You know the argument about how Britain excels at innovation but seriously struggles with commercialisation? I don't think there's a technology conference I've attended in the last decade, or a technology study I've read, where this hasn't been featured or mentioned. Reasons cited have usually included a shortage of capital, a cultural aversion to risk, and a lack of relevant skills or experience.

At some point, all of these things have been true. What's more, it is the combination of these factors that has made commercialising young British technology and engineering businesses that much more difficult. But the UK scene has transformed in recent years and many of the old excuses for our lack of success no longer hold true.

For one, the UK now has more than enough capital available to back its start-ups. Groups like Imperial Innovations, IP Group, Woodford Patient Capital, Cambridge Innovation Capital and more recently, Oxford Sciences Innovation, the new £320 million Oxford-based fund, all actively provide support to IP-rich companies at early stages of development. These are sizeable funds capable of supporting businesses from inception through 'B' and, in some cases, 'C' rounds of investment.

The government's innovation agency, Innovate UK, awards vital grants to many early stages businesses, providing a bridge from research funding to commercial, private sector backing. Since 2007, Innovate UK has invested over £1.5bn in innovation, matched by a further £1.5 billion in partner and business funding.[1]

1 Source: Innovate UK – https://www.gov.uk/government/organisations/innovate-uk

And let's not forget the plethora of business angels, technology transfer groups, corporate venture capital funds, accelerators and crowdfunding platforms, all providing access to capital and support for young businesses.

So much for the perceived lack of capital, what about the UK's aversion to risk and its fear of failure? This too has been cited on numerous occasions as a reason for Britain's failure to develop more robust businesses. Yet 2015 is set to be a record year for new business creation, with more than 600,000 new businesses expected to be established. This will break the previous record set in 2014, which broke the previous record set in 2013.[1] Setting up a business is a very risky venture. With these numbers, I think we are seeing a cultural transformation taking place and we are becoming less risk-averse than we have been in the past.

This leaves us with management.

I'm a recruiter and I run an executive search group that builds boards and management teams for young technology and engineering businesses. How convenient for me to address this as a key reason, you might think, given my interests. But bear with me.

"This is about 'customer-centric' application engineering. And quite simply, we do not have enough of this capability in the UK."

Chris Reichhelm, MD Peloton Advisors

For young technology and engineering businesses in this country, there is excellent talent. Recruiters like me wouldn't have much of a business if there wasn't. But without wishing to over-generalise, we are missing something that is vital to the growth and scale up of these young companies.

This 'missing link' is the ability to transform technology – our innovations – into a form that is suitable for a customer's requirement. This is not about technology innovation. Rather, it is about taking technology from the lab and transferring it into an application or a device that matches a major blue chip corporate's standards, disciplines, economics, processes, supply chain and environment/health & safety considerations. This is about 'customer-centric' application engineering. And quite simply, we do not have enough of this capability in the UK.

Like many, I used to think that Britain's collective failure to commercialise was based on poor business development skills. The more I've worked with businesses in IP-rich areas, however, the more I've come to realise that it's got less to do with negotiating ability and more to do with Britain's ability to get technology onto platforms that clients can use. It is this crucial skill that is preventing us from commercialising our innovation on a grand scale.

So how can we address this?

1 Source: StartUp Britain – http://www.startupbritain.org/

The first thing is that boards and executive teams need to be aware of it. Early on in a company's development, the parties involved in guiding young businesses need to be thinking about how and when to actively engage in application development. This is tricky, given that determining where a platform technology should place its bets is one of the critical challenges facing such businesses. From what I've seen, however, the time when a young company starts to engage seriously with corporates is the time when they should be making these decisions.

This is especially true of companies with licensing models, where the tendency is to leave the application development to the potential licensee. Too many British IP-rich companies with licensing as their business model fail to take application development seriously enough. I believe that it is this failure that prevents many of these companies from progressing further.

Secondly, at the point when a board believes the time is right, they need to recruit talent into the team to lead this application development. This is not the responsibility of the CTO. Product or application development is not the same as technology development, and these two roles should be separate. They represent very different skill sets and should be led by different individuals. What's more, the CTO and Product or Application Delivery lead should be peers. One should not report into the other.

> "Too many British IP-rich companies with licensing as their business model fail to take application development seriously enough."
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> *Chris Reichhelm, MD Peloton Advisors*

The final thing is that the organisation needs to develop a maniacal focus on customers. This sounds obvious, and it probably is, but too many young British companies do not possess this mindset. Instead, many see their time with young businesses almost as a continuation of university, with a chance to further explore the capabilities and limits of the technology. For many, it is less about customer requirements and more about their own interests.

This will be controversial but I do wonder whether the British are at a cultural disadvantage on this last point. British technologists are renowned for their brilliance, creativity and particular way of working. They excel at innovation and invention. They know their own mind and are fiercely independent. The culture of many of their young businesses is similar in nature and it makes me wonder just how comfortable they are when dealing with a corporate's priorities instead of their own interests.

The UK has come a long way towards serious value realisation. There is capital, ambition and willingness to try new things. Over the past ten years many of the obstacles that have traditionally been in our way have been removed, placing us closer than ever to a new era of value realisation from these young businesses. But we will only succeed if we can demonstrate mastery of the mindset and skill set highlighted here. It is these that will impact our ability to succeed more than anything else.

Who should we recruit?

Advanced materials companies are characterised by corporate-dominated supply chains. No matter the technology or its application, corporate support is critical in bringing new technology innovation to market. As such, young advanced materials companies are but a link in a longer supply chain. Identifying the key corporate players who surround such young companies is important.

Even more important is the ability of the materials company to establish itself as an influential link in this chain. To realise this, it's important to recruit the right executive team; specifically, this means individuals who have been successful within similar corporates within the supply chain. I'm not referring to corporate executives with little in the way of achievement, energy or influence. I'm referring to those with impact.

These individuals need to be on the executive team, not just the board. Boards of directors are strategic and helpful but they don't craft licence deals or take responsibility for application delivery. No corporate partner ever signed a commercial agreement because of the involvement of a non-executive director. Executive teams do the work. This is where the talent is required.

Such individuals should be recruited to four roles, including:

- CEO
- CTO
- Head of Engineering
- Commercial Director

Not all of the individuals within an executive team need to possess such corporate experience. CTOs, for example, are often founders and may possess little in the way of corporate experience. Despite this, their understanding of the technology may require them to continue leading R&D.

> "If we are serious about building world-class materials businesses, we need to recruit from overseas, particularly the North American, European and Asian markets."
>
> *Chris Reichhelm, MD Peloton Advisors*

For the other roles, however, strong corporate experience or representation is very important. Here's why:

1. They've experienced how companies in the supply chain make commercial and technology decisions.
2. They're accustomed to delivering products and services on time, to a certain specification, via certain practices and within a certain budget.
3. They are global in outlook and experienced in different geographies, cultures and ways of doing business.
4. They have been very well trained and understand the management practices required of companies within a certain supply chain.
5. They understand how to scale businesses and manage multiple stakeholders.

"But big company executives don't understand innovative, resource-constrained, early-stage businesses. They're not entrepreneurial. It's too risky. How will they fit in?"

Yes, that's right. By and large, big corporate executives fail to understand what life is like for young companies. Most of them are not right and do not fit in. The challenge for advanced materials companies is to identify those individuals with the right combination of experiences capable of making such a transition, and doing so successfully.

Entrepreneurs aren't only to be found in small businesses. Some of them joined larger businesses early in their career and have progressed their career via entrepreneurial opportunities within smaller businesses. The key is identifying them.

Where can we find them?

The term 'advanced materials' covers a wide range of industries, each one with its own supply chain. It's not appropriate to go into each supply chain now.

It is worth commenting, however, that we cannot rely on talent just from this country. Quite simply, Britain does not have enough high quality, experienced commercial, engineering or technology talent to fulfil these companies' requirements. Mind you, we have plenty of people who are willing to help but willingness does not translate to quality.

If we are serious about building world-class materials businesses, we need to recruit from overseas, particularly the North American, European and Asian markets. These are significantly larger markets, with more successful materials businesses and significantly greater pools of talent. Many of these individuals are closer to other key players in the supply chain and therefore, closer to the customer. There are large numbers of British executives based overseas too, in similarly focused roles with leading companies, although building an internationally diverse business should take priority over cultural homogeneity.

Advanced materials companies in the UK do not have the luxury of relying on UK-based talent alone. Our population of relevant talent is simply too small. If we're serious about building a world-class team, we need to search overseas.

"But we don't have the money to recruit people from overseas? What if they require relocation? What if they don't work out? It's going to be very expensive."

Such exercises can be risky, yes, but so are all recruitment exercises. We advise our clients to seriously consider whether relocation is essential. From our own recent experience, we see fewer companies demanding that executives relocate families and homes. Furthermore, there are no great differences in compensation structures or levels between those based overseas and those based in the UK. Finally – and I cannot stress this enough – the difference in value provided by the right person versus the wrong one is truly significant. Fundraising, commercial traction, team build out, proposition development – by every conceivable metric, successful appointments put companies on far stronger footing than those less successful.

Advanced materials companies in Britain need to become world-class at recruitment. As they seek to understand their supply chains, they should seek out executives with experience of successfully operating within such corporates. These individuals need to be able to adapt to life within smaller, innovative businesses, but they also need to establish the company within its particular supply chain. This demands a deeper level of corporate appreciation and an ability to get things done.

Unfortunately, there are not enough of these individuals in the UK. The market is simply too small. Like our supply chains, the hunting ground must be global.

Innovator profile 1:

Scandium: the next strategic metal

Q&A with Sam Riggall, Chairman, Clean TeQ Holdings Ltd

Planes, trains and automobiles – feeling fat and heavy? Lose weight now with Scandium, available from Clean TeQ Holdings

Clean TeQ Holdings Ltd (CLO: ASX) is an Australian mining company using advanced chemicals (ion exchange resins) in a hydro-metallurgical process to extract Scandium and other 'smart metals' crucial to the development of a new generation of light-weight advanced materials for trains, planes and automobiles (fuel cells, batteries, rockets and robots too).

> "The words 'miner', 'advanced materials' and 'clean-tech' don't often appear in the same sentence. But with Clean TeQ Holdings, they should."
>
> *Sam Riggall, Chairman, Clean TeQ Holdings Ltd*

The words 'miner', 'advanced materials' and 'clean-tech' don't often appear in the same sentence. But with Clean TeQ Holdings, they should. That's because smart metals like scandium, cobalt, nickel and manganese (the latter three being crucial to the future of batteries) cannot be downloaded from the iTunes Store. They have to be extracted from the earth's crust by miners. Through its choice of name, Clean TeQ Holdings is boldly and baldly positioning itself at the beginning of the long supply chains required to deliver clean-tech 2.0 (featuring light-weight, low emission transportation and other goodies). It is developing the world's first mine devoted 100% to scandium production.

Clean TeQ has signed a collaborative agreement with Airbus APWorks, the aircraft manufacturer's 3D printing and advanced materials subsidiary (which sponsored the previous Advanced Materials Society conference).

Sam is looking for more collaborative agreements. If you're an overweight plane, train, automobile or robot looking to shed a few pounds, Sam's your man. He sets out Clean TeQ's plans to become the world's most reliable supplier of Scandium and other smart metals.

Q: What is the business opportunity for Scandium?

Sam Riggall (SR): Scandium is a rare earth element, one that is rarely found in nature in appreciable concentrations. As a result, scandium's properties are only known to a restricted number of specialists. These experts have known for half a century that scandium is an exceptionally good alloying agent for aluminium. It is also used in the manufacture of solid-oxide fuel cells. We decided to buy the Syerston mine in New South Wales. The mine is rich in scandium, nickel, cobalt and platinum so we have the opportunity to supply these metals reliably and predictably to customers. For scandium, this will finally make it an attractive metal for deployment in aluminium-based applications, principally transportation. We believed that by combining a large, high-grade resource with Clean TeQ's proprietary technology we could unlock latent value.

Q: What is the potential impact of Scandium?

SR: Scandium is an extraordinary metal when alloyed with aluminium. It makes aluminium stronger, and therefore lighter for a given application; more resistant to corrosion, thereby avoiding the need for surface treatment; and weldable using conventional welding methods, an extremely critical benefit for aerospace. Imagine the weight savings that can be achieved by removing rivets from the body of an aircraft, not to mention the reduction in assembly time.

> "Through its choice of name, Clean TeQ Holdings is boldly and baldly positioning itself at the beginning of the long supply chains required to deliver clean-tech 2.0."
>
> *Sam Riggall, Chairman, Clean TeQ Holdings Ltd*

Q: Why isn't all aluminium treated this way?

SR: It's a shortage problem. Those companies that would wish to use scandium alloys for mainstream industrial applications, such as building cars or airplanes, have always lacked confidence that sufficient scandium would be available. That is because no mine has ever been built that produces scandium as a primary product. To date, most scandium has been produced as a by-product of the treatment of industrial waste, mostly in the titanium pigment industry. Clean TeQ has successfully produced scandium in this manner through the application of our continuous ion exchange process in Japan. But what we are offering now at Syerston is something radically different. We propose the development of the world's first mine devoted 100% to scandium production, by first leaching the scandium into a solution, then using Clean TeQ's proprietary ion exchange process to extract it and yield scandium oxide for commercial use.

Q: What's the current market for scandium like?

SR: There's not an openly traded price in the market, as all contracts are private. Published figures I have seen vary from anywhere between $1,700 per kilogram ($1,700/kg) and $6,000/kg. That says to us that this is quite a dysfunctional market. In order to create a viable scandium market, we must not only establish supply reliability but also establish a price that creates value for customers and creates end users. Scandium is now a niche rare metal. Our objective is to commoditize it with reliable supply, consistent product specifications and significantly lower pricing. To achieve that, we need a scandium mine.

> "Smart metals like scandium, cobalt, nickel and manganese (the latter three being crucial to the future of batteries) cannot be downloaded from the iTunes Store. They have to be extracted from the earth's crust by miners."
> *Sam Riggall, Chairman, Clean TeQ Holdings Ltd*

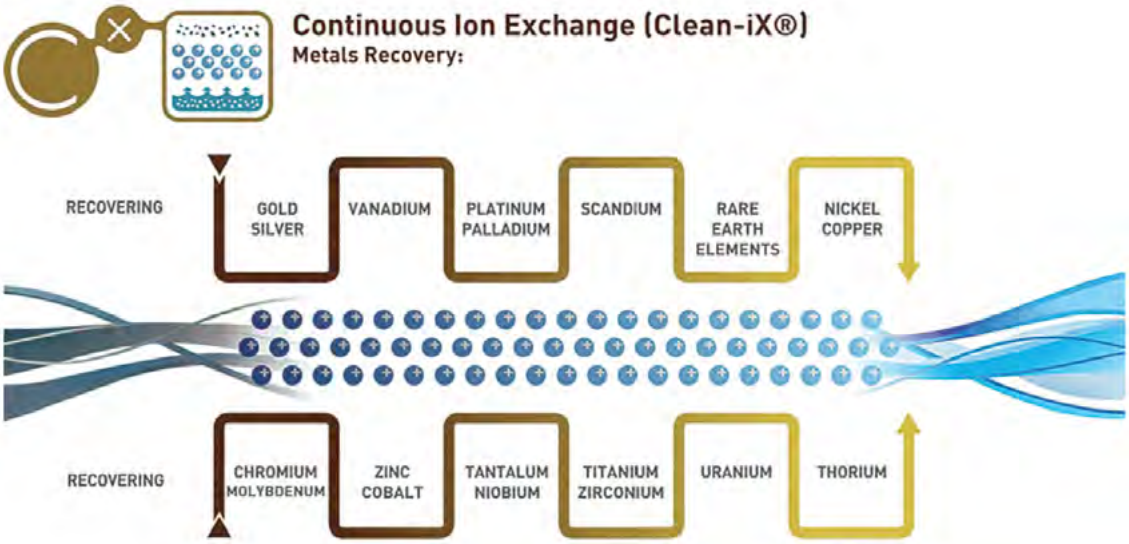
The benefits of a minable supply of scandium are clear. First, a known, reliable production base that is not dependent on by-product production, which is subject to indirect, second-hand reduction. Second, a reliable production base leads to cost certainty, as well as significant cost reduction. We have a valuable proposition for industry with Syerston: stable production with lower costs. And we intend to supply key players in the transportation sector.

Q: What is the significance of Clean TeQ's agreement with Airbus APWorks GmbH and KBM Affilips BV?

SR: Airbus is, as you know, one of the world's largest aircraft manufacturers. APWorks is an Airbus division that commercializes technologies developed by Airbus, in particular manufacturing technologies focused on 3-D printing. KBM is one of the world's largest manufacturers of master alloys, which that company calls the "spice rack for the metal industry." In other words, the particular composition of a master alloy fine tunes the properties of the metal product.

Scandium's challenge is not in permitting, mining or processing; it is in marketing. As Clean TeQ progresses the development of Syerston, we must prove a demand for the scandium it produces. From the start of this process, it was clear we needed to engage with end users and all along the supply chain. The significance of our agreements with Airbus APWorks and KBM is that they demonstrate our eagerness to work with major end users and persuade them of our ability to provide a reliable supply of scandium at the right price.


Scandium | The Next Strategic Metal
Scandium
21
Sc
44.956
Scandium (Sc) commonly marketed as Scandium Oxide (Sc_2O_3).
Sc is abundant in Earth's crust but rare to find concentrated occurrences for economic extraction.
Scandium's value as an alloy of aluminium has been well understood for decades.
Scandium can play a key role in the development of high performance materials in the aerospace, transport, energy and consumer sectors.
Scandium also plays a key role in the distributed power generation market through solid oxide fuel cells.
Creating sustainable solutions for oil and gas, municipal, mining, agriculture and industry.
CleanTeQ
environmental innovation


Continuous Ion Exchange (Clean-iX®)
Metals Recovery:
RECOVERING
GOLD SILVER
VANADIUM
PLATINUM PALLADIUM
SCANDIUM
RARE EARTH ELEMENTS
NICKEL COPPER
RECOVERING
CHROMIUM MOLYBDENUM
ZINC COBALT
TANTALUM NIOBIUM
TITANIUM ZIRCONIUM
URANIUM
THORIUM

Innovator profile 2:

"Moore's Law has not changed. It's just being re-defined"

Q&A with Kirill Mudryy, Enso Ventures

Enso Ventures is a private investment company based in London and New York that invests in Materials-Technology and Biotechnology in Europe and the US. Enso looks for early-stage companies with the following attributes:

- Disruptive technology platforms with products that address unmet needs in high growth markets
- Potential to become market leaders
- Strong IP
- Capable management with an aspiration to become global leaders

Enso Ventures has invested £50m in ten companies since 2012. The advanced materials investments in Enso's portfolio include:

Picodeon – www.picodeon.com

A Finnish nanotechnology company specializing in thin-film coatings and surface treatments, Picodeon's Coldab® coating technology is an advanced Pulsed Laser Deposition (PLD) process offering the unique benefit of being able to deposit virtually any type of layer on any type of material. Picodeon's applications include filters and electrical insulation layers, something necessary for instance in Li-Ion technology.

Nanotherm – http://www.camnano.com/

A British producer of innovative nano-ceramic thermal-management technology, which uses thin-film techniques to produce Nanotherm DM, a material with properties that rival exotic ceramics, but at a fraction of the price. Initially targeted at the Chip-on-Board and LED packaging markets, Nanotherm DM allows LED manufacturers to make significant cost savings without impacting the performance of their products.

Carbodeon – http://www.carbodeon.net/index.php/en

A Finnish nano-diamond technology company that improves wear and abrasion resistance, and provides improved anti-corrosion, low friction and other surface finishes. Carbodeon's applications include metal plating and thermal management in polymer parts.

ENSO VENTURES

Kirill Mudryy is an Investment Manager at Enso Ventures, an investment company focused on advanced materials. He sits on the board of three of Enso's portfolio businesses, Picodeon Ltd Oy, Cambridge Nathotherm and Enso Detego.

Q: What's different about Enso Ventures?

We're a rare example, in Europe at least, of a venture fund focused on advanced materials. This means electronics-related materials, as well as new or improved engineering materials like coatings and surface enhancements, new catalysts and ceramics, to name a few. These are fundamental building blocks for any technology. We are backed by a single limited partner who is a great believer in the value of fundamental science and technology. This gives us a unique opportunity to be flexible and to deploy 'patient capital', which is extremely important in materials-related ventures. Materials investments can take time, but at Enso we are specialists at accelerating time to market and building successful companies in this area.

> "We are investing in advanced materials technologies that break the choking point and produce the innovation that is demanded in by electronics and other industries."
>
> *Kirill Mudryy, Investment Manager, Enso Ventures*

Q: How do you differ from other VCs, both financial and corporate?

We are one of very few VCs that specialise in early stage material science companies and we are actually prepared to get involved much earlier in the investment cycle than most financial and corporate VCs. We can provide the early-stage funding required to get technology to the stage at which it is interesting and useful to corporates. For brand new start-ups in the advanced materials space it can be difficult to know which markets to target or who to recruit to build the team. We have the capabilities to help our portfolio businesses with business development, strategy, recruitment and other key issues. A lot of VCs say they are hands-on. We really are, especially in the early stages when there are more gaps to fill.

> "We're a rare example, in Europe at least, of a venture fund focused on advanced materials."
>
> *Kirill Mudryy, Investment Manager, Enso Ventures*

ENSO VENTURES

Q: Why Advanced Materials?

These days most VCs are still chasing internet deals. And some are very good at it, but for every Uber there are thousands of software tech companies that fail. But for advanced materials, we believe that careful selection focused on fundamental science and IP, mitigates the chances of failure. If a company we invest in has unique IP that can't be easily copied, and there is an identified market that requires this technology, and the fundamentals of successful business case are there, then the company will not fail. It might take longer to succeed, but it will not fail.

Q: What is driving the uptake of Advanced Materials? Why does Enso see this as a growth sector?

At heart we still believe that Moore's Law has not changed. It's just being re-defined. We know that there is demand for smaller, faster and more energy-efficient electronics across an ever-growing range of industries as the 'Internet of Things' becomes a reality. Other industries are waking up to the fact that having more function in their products gives them a competitive edge. And these additional functions and features are often enabled by new underlying materials. We know that this demand can't be met with current materials technologies, that VCs grossly neglected this area, and that this is therefore creating a choking point. Or to put it differently and more positively, it creates an opportunity for Enso because we are investing in advanced materials technologies that break the choking point and produce the innovation that is demanded in by electronics and other industries.

Q: What is your view on the growing interest of corporate venture capital in advanced materials?

Of course, we're excited. We see opportunities to work together and we'd like to see the type of ecosystem created around advanced materials that has grown up around biotechnology for instance. We also see it as an admission from corporations that they can't produce all the innovation they need internally. They need to look externally and venture with new and innovative companies, like those in our portfolio. This increases our confidence that our investments in fundamental technologies will pay off in the near future.

"Picodeon can dramatically improve the efficiency of Li-Ion batteries by improving the performance of thin film separators."

Kirill Mudryy, Investment Manager, Enso Ventures

Q: Advanced materials typically have potential disruptive applications across several markets. This can mean that advanced materials companies end up as 'jacks of all trades, but masters of none'. How do you manage what is now being referred to as 'platform technology syndrome'?

We want our portfolio companies to be very focused on one or two markets, not more. Choosing those can be difficult, but we believe that is one of our competitive advantages as a VC, and critical for setting our companies up for success. For example, Picodeon is focused on lithium ion and sensor industries, while Nanotherm is focused on the high-power LED and power electronics markets; all of which are growing fast.

Q: Let's talk more about your portfolio, starting with Picodeon. Why did you invest?

We identified Picodeon as the 'best in class' company with super-fast thin film deposition technology, which we know is going to be extremely important to many industries, particularly batteries. Picodeon can dramatically improve the efficiency of Li-Ion batteries by improving the performance of thin film separators. Separators are used in batteries to prevent short circuiting, but they typically deteriorate over time. Picodeon's technology creates stronger separators that are also lighter, allowing smaller batteries with longer lifetimes and greater efficiency - three properties that the high-growth EV and 'Internet of Things' market is crying out for. This is an example of an advanced material that enables function and can potentially change the economics of the industry. Picodeon also has extremely strong IP, and a visionary management team. So investing in this company was an easy decision.

Q: What areas of Advanced Materials innovation excite you most?

We're looking at quantum computing, lithography, new chemicals for thermo- and conductive plastics, new oxides, transistors and high-temperature materials, to name a few. But we keep an open mind. Often, you don't know what innovation you're looking for until it finds you. If it's a revolutionary technology that is related to advanced materials then we want to hear about it. But unmet market needs are what should drive innovation, and we often have to turn down interesting stuff that we can't see a road to commercialise

Q: How does Enso work with other investors, financial VCs and corporate VCs?

We have very positive experience in co-investing with other VCs and corporates in our pharmaceutical investments. This hasn't happened as often as we'd like, probably as there are few investors in the advanced materials space so far. Also another differentiating factor, we have invested into our advanced material companies relatively early and for the last few years we have been focusing more on building a stronger company. However now when some of our portfolio companies are quite mature and ready to work with new investors, we will be actively looking for new partners.

Innovator profile 3:

Oscillated, not stirred: NiTech Solutions' license to crystallise (continuously)

Q&A with Paul Hodges, Chairman of NiTech Solutions

NiTech Solutions is a spin-out of Scotland's Heriot-Watt University, Edinburgh. The company designs and licenses new reactors and crystallisers based on patented baffled reactor technology. Paul Hodges is NiTech's Chairman. He previously worked for 17 years at ICI.

Q: What's NiTech's innovation? What do you do that other companies can't do?

Paul Hodges: It's all in the mixing. We don't stir. We oscillate. Like all the best inventions, ours is quite simple really. The IP is built around continuous reactors that are tubular and baffled. Rather than manufacture chemicals by stirring pots in old-fashioned capital-intensive batch processes, NiTech oscillates molecules (which can be chemicals, pharmaceuticals, agrochemicals) to create continuous reactions in glass, metal or plastic tubes with baffles.

> "We don't stir. We oscillate."
>
> *Paul Hodges, Chairman, NiTech Solutions*

Q: What's a baffle?

PH: A baffle is just a very clever form of a washer. By inserting baffles in tubes, we create eddy currents when we oscillate the flow with a piston.This creates perfect conditions for continuous reactions and crystallisations.

Q: From a layman's perspective, can you explain the difference between conventional stirring and NiTech's oscillating.

PH: Everyone can relate to stirring sugar into a cup of tea. That's exactly what you do in a reactor, albeit on a much bigger scale. The bigger the stirring vessel becomes, the more dead spots you have where the stirring is not having effect, and the more inefficient it becomes. In a reactor, it is not so easy to change direction, like you can with a spoon in a cup of tea. In oscillation, you are effectively creating lots of little cocktail shakers that allow you to mix all the ingredients very thoroughly and achieve much better mixing. The more shakers you have, the better the mixing. This is why James Bond liked his vodka martinis 'shaken, not stirred'.

Q: Ingenious

PH: Very. To the best of our knowledge NiTech is the only company in the world that can do continuous reactions and crystallisations with liquid, gas and solid materials over reasonably long periods of time. This is an environmentally friendly innovation that will reduce costs, reduce energy consumption and increase quality in the manufacturing of a very broad range of products in the chemicals, pharmaceuticals, food and drink, and biotechnology industries. From high value pharmaceuticals to cheap and cheerful commodities, NiTech reduces costs and increases quality.

Q: How do you make money?

PH: Our business model is based on licensing. We sell laboratory and pilot units to our customers and then do the design and licensing for full-scale units, including project management, installation and training.

Q: Who are your customers?

PH: We are just moving out of the development stage at the moment. Typically, we sell to large European and North American chemical and pharma companies. For example, Sanofi uses our technology in one of the world's largest continuous pharma production plants, where our continuous reactor is used as part of key synthesis step handling three phases. In June this year, Bayer Technology Services bought one of our units, having identified it as a potential key technology for the future. Our technology is also being piloted by several other large companies ahead of potential full scale applications. The technology was also the inspiration behind the UK/Scottish government's £120m investment in the new Continuous Manufacturing and Crystallisation Centre at the University of Strathclyde, which is helping companies to gain practical experience in the use of our technology.

> "NiTech is the only company in the world that can do continuous reactions and crystallisations with liquid, gas and solid materials over reasonably long periods of time."
>
> *Paul Hodges, Chairman, NiTech Solutions*

Q: What are your plans for the near future? What do you need?

We're looking for further early adopter customers to accelerate our growth. We believe that in time NiTech can transform up to around 70% of the relevant processes. But of course, it takes time for the majority of prospective users to become aware of the potential benefits. We're currently identifying these early adopters and will be very glad to hear from more. We'll also need capital for scale up and are looking for investors from among our client base (i.e. corporate venture capitalists) and from among financial and angel investors with knowledge of chemicals manufacturing.

Venturing update:
Advanced materials ecosystem explored

Toby Lewis, Editor, Global Corporate Venturing

The Advanced Materials Society will pull together investment data on corporates venture capital in this and related areas, using our data product GCV Analytics.

In early efforts to track the sector, we have analysed all deals in the energy and industrial sector, as well as all corporate venturing units which are active in the sector. In future, we anticipate being able to drill down more specifically into the advanced materials space. All analysis is based on data from the beginning of 2011 to the end of 2015.

As can be seen, typically we are tracking between 60 and 70 deals per year in the sector, (see deals in energy and industrial sector graph) and the majority of deals are C rounds or below. Unlike other sectors such as information technology, there has not been a marked increase in energy and industrial deals in recent years. This may be in part because of hits to activity in the energy sector caused by the collapse in the price of oil.

Corporate venturing units from the energy and industrial sector are investing across a gamut of sectors, with deals classified by us as information technology taking an increased share of activity (energy and industrial firm deals).

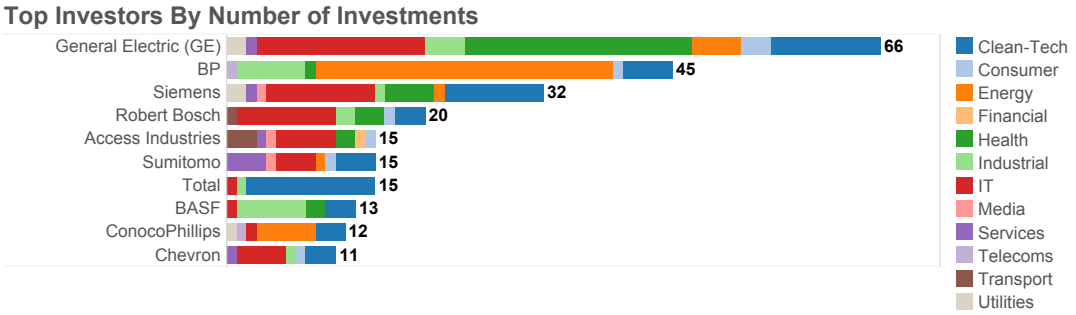
Historically, UK-based oil and gas company BP, largely through its unit BP Ventures, has been the most active investor in the energy and industrial sector, and it is also typically more active at later stage than many units. General Electric, largely through its unit GE Ventures, is the second most active unit in the energy and industrial sectors, and the most active energy and industrial group across the board. Industrial groups Siemens, Robert Bosch, Access industries and Sumitomo have also been active, as have oil and gas companies Total, ConocoPhillips and Chevron, and chemicals group BASF.

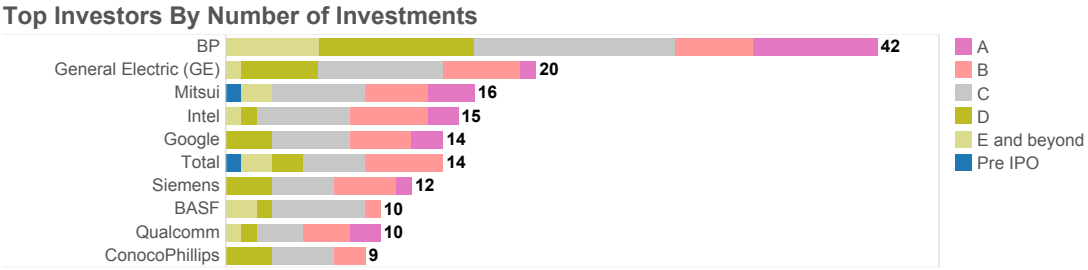
We have also attached the largest deals in the energy and industrial sectors, of which we treat clean-tech as sub-set, and the largest deals by the energy and industrial companies themselves.

As can be seen, deals by energy and industrial groups have risen most markedly in size at later stage during 2015, which echoes large amounts being invested at later stage across all of venture capital.

We will be looking to ramp up our data analysis as the society develops, and so do let us know what kinds of areas you would like us to explore.

Venturing update:
Advanced materials ecosystem explored





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Venturing update:
Chemicals meets wearables via 3D printing

Tom Whitehouse, LEIF

There's been some very intriguing venturing along the advanced materials and advanced manufacturing value chain in the summer of 2015. For example, European chemicals giant Evonik made a VC investment in Wiivv Wearables Inc, a Canadian start-up that plans to integrate electronic sensors into 3D-printed shoe insoles that use Evonik's chemicals. Yes, the previous sentence requires re-reading doesn't it? A chemicals company investing in shoe insoles – what's going on?

> "The good news for venture capitalists focused on advanced materials and manufacturing is that wearables will rapidly accelerate the update of vanguard manufacturing techniques such as 3D printing, while also stimulating demand for speciality materials."
>
> *Tom Whitehouse, LEIF*

Wiivv is a fascinating deal because when you unpick its financial and strategic rationale, you get a glimpse of the industrial transformations being forged by the convergence of advanced materials and manufacturing. This is what Germany call 'Industrie 4.0', GE calls the 'Industrial Internet' and what GCV and LEIF address in the Advanced Materials Society.

"Wiivv's business is an ideal match for Evonik," says Dr. Bernhard Mohr, head of Venture Capital at Evonik. "Through our investment in Wiivv, we're supporting the market launch of one of the first individualized mass-produced articles to be manufactured by 3-D printing."

Currently, 3D printing is mostly used for prototyping new products. When the product goes commercial, conventional volume manufacturing kicks in. But Wiivv will use 3D printing for mass production of bespoke insoles (because our feet are all different). The market for insoles may sound 'nichey', but Wiivv says that in the US alone, it's estimated at $4bn per year (growing at 4%), which is not a bad niche.

The strategic link for Evonik is that Wiivv uses one of its high performance polymers – polyamide 12 – in the 3-D printing process. Evonik is investing in a business which will enlarge the number of innovative applications for one of its speciality chemicals. This is classic corporate venture capital – invest in innovation that opens new growth areas for your business, rather than wait to be out-innovated.

"[Wiivv] also gives Evonik access to the highly innovative growth market for wearables," says Mohr.

Wearables (electronics worn on the body) is a market poised for explosive growth that every corporate wants to access. The good news for venture capitalists focused on advanced materials and manufacturing is that wearables will rapidly accelerate the update of vanguard manufacturing techniques such as 3D printing, while also stimulating demand for speciality materials and chemicals that are turned into products through advanced manufacturing.

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Advice: How to raise capital from corporate VCs

10 pieces of advice for advanced material and physical sciences start-ups

Tom Whitehouse, LEIF

1. Treat capital-raising as a business development exercise
2. Keep it complicated stupid
3. Start raising capital from corporate VCs long before you need it
4. Allocate time efficiently
5. Don't limit your exit options
6. Communicate exceptionally well
7. Also approach financial VCs and find 'Sherpas'
8. Choose advisors carefully
9. Don't raise capital unless you need to / want to
10. Ignore advice – do it your way

1. Treat capital-raising as a business development exercise

If you're going to give a substantial shareholding and say in the running of your business to outsiders, make sure they are able to make a significant contribution to your growth. In this way, they quickly become insiders.

Corporate venture capital is a fancy phrase for something quite simple; a larger company (call it Y Co) provides a blend of capital, products, expertise and market access to a smaller company (call it X Co) in return for a share of its future growth and use of its technology. What's the difference between corporate venture capital and plain business development / collaboration (joint development agreements etc.)? Corporate venture capital in the (physical sciences space at least) works best from a start-up's point of view when it's done like this:

- X Co is selling into more than one market, i.e. Y Co is not its only route to commercialisation. So X Co maintains its independence from Y Co, and is a potential acquisition target for other large companies. Thus X Co's exit options are not restricted by Y Co's investment.
- If X Co is subsequently acquired, Y Co gets a return on its investment alongside all the X Co shareholders, i.e. Y Co gets a financial and a strategic win-win (a happy CTO / Chief Innovation Officer and a happy CFO).

Sounds simple? It's not. It's complicated.

2. Keep it complicated stupid

If God had wanted term sheets to be simple he would never have created corporate venture capital. Typically, Y Co wants to combine investment with various 'side agreements' - such as rights to use/sell the technology in a certain region or with certain clients over a certain time frame, and a stake in 'process IP' developed through collaborative development agreements. If they've overdosed on caffeine that morning, Y Co might even ask for a right of 'first refusal' if and when you are put up for sale (a definite no-no). But these are the type of complications a start-up needs because they are symptoms of growth. (If you don't want 'side agreements', stick to financial VCs - see below). The trouble with complications is that they take time.

3. Start raising capital from corporate VCs long before you need it and make sure you're already well-capitalised

The time to start looking for capital from corporate VCs is at least a year from the date when you really need it. Why? Because you need this time to negotiate the side agreements.

"My advice to companies seeking money is that if you want money fast, don't approach us. A [Bekaert] business unit has to assess a technology before the venture professionals like me can really start our work in earnest."
Nuno Carvalho, head of venturing at Bekaert, the Belgium-based steel wire transformation and coatings business.

Y Co's venture team has to speak to the relevant business units to establish whether there is a strategic need for your technology. This takes time. You may already know the business unit which needs your technology. If so, tell the corporate VC because it's possible he/she doesn't. (Yes, communication between a corporate VC and its business units can be imperfect). This will help speed things up. Initially send non-confidential information. Don't insist that a corporate VC sign an NDA when you're in the initial assessment stages because it's unnecessary and it takes time. Sign an NDA once the corporate has shown interest and needs to go into more detail. This will also take time (and it should because you need to get it right). By now, you've probably already been talking to them for 1 - 2 months and you've barely begun.

4. Allocate time efficiently

Time is a luxury that only the well-capitalised can afford so the Sherpas of corporate VC deals (that's you, your family / friends / angels / governmental investors etc.) need to be able and willing to carry the business during the minimum 12 month period you're talking to corporate VCs.

If you're not careful, fund-raising can be such a distraction to senior management as to obstruct growth. So be ruthlessly efficient. Do as much research on potential investors as they would do on you. Who really needs your technology? Who is the best partner for market access? Don't do the classic 'dog and pony' road show and speak to a bunch of ineligible investors, many of whom will be happy to meet you because of the free education you'll provide them on you and your markets.

5. Don't limit your exit options

If you get a corporate VC on board that ticks your boxes, great. But be wary of their impact on your brand and on your business development strategy. Most large corporates have very potent brands. Once you're in their portfolio, some potential customers and acquirers (i.e. your potential exit route) will see you as a 'Y Co company'. They might not check the detail. They may just assume that Y Co will acquire you. Y Co may also inadvertently or deliberately seek to ensure that your management focusses exclusively on developing your business for its markets to the neglect of your other markets, which can lead to one-sided business development. Again, this might limit your exit options.

To avoid these dangers you need a strong board, ideally with more than one corporate VC represented (for balance), and/or an experienced financial VC that can hold its own with corporate VCs. You'll certainly also need an independent Chairman with proven expertise in managing a talented and lively board.

It's imperative also to make sure that the commercial deal with your corporate VC is not your only route to commercialisation and that a trade sale is not your only exit option.

"I generally recommend that our portfolio companies focus on commercialising a product where they actually can penetrate the market and/or hold the "juiciest peach" for themselves … It is also important that there be a real possibility for the company to survive as a profitable stand-alone company, ideally with a credible (or even initiated) path to IPO."
Keith Gillard, Managing Partner, Pangaea Ventures, Canada-based advanced materials investor

NanoH20, the Californian water treatment company, now LG Water Solutions, is a great case study in this regard. It had Total Energy Ventures and BASF Ventures (two potent brands) among its shareholders alongside experienced financial VCs. Many in the market assumed that NanoH20 would be bought by BASF, which had previously acquired Inge, another water treatment business from the BASF Ventures portfolio. But LG bought it (and all investors, corporate and financial, got a decent return). NanoH20 had good balance.

6. Communicate exceptionally well

Sorry for the cliché, but you only get one chance to make a first impression. Get your story clear and strong. Make VCs life easier by hitting them hard between the eyes with a clear statement of how your management team and technology solve big problems profitably. VCs are different from you. They look at hundreds of companies, whereas as you're mostly preoccupied with a few (your company, your current and potential customers and your competitors). So in the early stages of your fund-raising campaign, which is actually a longer-term business development campaign (see above), make sure you are very good at being superficial! And make sure that your communications are consistent across all media – website, LinkedIn, twitter, press etc. If your website says you sell bananas, but LinkedIn says you sell apples, VCs are entitled to feel confused and conclude that you're confused.

But be ready for VCs to get into deep detail very quickly. If this were a medical examination, you'd have your tongue examined and pulse checked, and then you'd immediately be stripped naked and readied for endoscopy (not quite, but you see what I'm getting at).

You'll have to explain why you and your technology is superior not just to easily identifiable incumbents and has-beens, but to other start-ups lurking stealthily in the mist and the start-ups that could emerge in the next few years (i.e. during the lifespan of the VC's investment in you). "We're much better than Kodak" won't wash.

7. Also approach financial VCs and find 'Sherpas'

After those hours spent on side agreements with corporate VCs, a financial VC focused exclusively on financial returns might be a relief. But remember that it's a financial VC's job to be impatient. "We need to make 10 X our investment and we need to do it fast," one told me recently with admirable honesty. But if you're still at a relatively early stage of development, you probably require patience. So look to other groups of investors (angels, super-angels, angel syndicates etc.). When doing your research, look closely at corporate VC investments in companies you like and on the shareholder register you'll find the unacknowledged Sherpas of corporate venture deals – those who carry you from the foothills to the summit (or summit base camp). I like the look of Real Ventures, a Montreal-based early stage investment company staffed by entrepreneurs. Real took an early interest in Wiivv Wearables, the Vancouver-based 3D printing-meets-wearables-via-chemicals business, that raised money from Evonik Venture Capital over the summer of 2015. Find a Real Ventures near you. They're out there.

8. Choose advisors carefully

Establish what your needs are before you appoint advisors. Establish exactly the gaps you need to fill and then fill them. In my experience, early stage IP-rich businesses often underestimate their need for advice on IP development and protection, which is absolutely crucial when you're engaged in business development across multiple industries. So get a good lawyer with expertise in IP. You might be surprised by how little they will charge in the early stages of your development. (They want the fees at the IPO or trade sale). And beware of advisors pretending to be investors. Ask: "Do you have funds under your direct management?" If an investor has no funds under management, he's not an investor, he's an advisor.

9. Don't raise capital unless you need to / want to

"I love the independence of owning 100 percent of the shares, of having to think only about the products and not to worry about shareholders. In that sense, we're completely free."
Sir James Dyson (Founder, Dyson)

External investors will want control over, and a say in, your business. If you'd rather have complete freedom of manoeuver / not be told what to do, then do everything you can to stay alone (beg and borrow from trusted friends and family, get grants from governments). You might grow more slowly, but if independence is what you want, then this will be a sacrifice you're going to have to make.

10. Ignore advice – do it your way