



**Materials
Processing
Institute**

INNOVATION AS THE KEY TO GROWTH

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Innovation as the Key to Growth

Thank you to Bob for that kind introduction and also for the invitation to speak here this afternoon. I have found this a particularly difficult talk to prepare. You may know me and know that I am an enthusiastic supporter of innovation as a differentiator and a driver for growth in business and manufacturing, but that seems to me to be a difficult message to give right now, when industry in general is going through tough times and the industry in which I am most experienced, the steel industry, is suffering terribly in the UK. It can be difficult to remain optimistic about innovation when you don't know if your customers, or suppliers, will even be in business in the coming weeks, or months. However, it is at these times, when the strategic options available to a business are at their most limited, that innovation is sometimes all we have, to fall back on.

It is important to consider what we mean by innovation, or what I mean in this context. As Bob mentioned, I lead the Materials Processing Institute and we undertake innovation projects for companies large and small across a wide range of sectors. I've also worked in commercial teams, research teams, in operations and as a technical manager. In these many roles I have been both the person in need of an innovation intervention and the person delivering it. I have been the person tasked with keeping the line running and the customers happy. This, I think, gives me a strong perspective on what innovation means to an industrialist, or a business owner and what it means is solving a problem that adds immediate, tangible value to my own business, either through reducing cost, improving quality, or improving the customer service. Undertaking research and solving interesting technical problems all have their place, but innovation combines invention, or problem solving, with commercial application and it is by taking this approach that a company can start to gain competitive advantage from the application of innovation to their business.

Some people would regard this as too restricting a set of constraints, but to the true innovator, any business, process, or product line, present an infinite scope for innovation and value improvement. To illustrate this point, we recently appointed a new finance director at the Institute. He won't mind me telling you that whilst he had worked in engineering companies in the past, this was the first time he had been involved in a business that undertook industrial research. Everything was fine for the first three months, or so, when he came to me and said: 'Chris, Chris, I'm very concerned about our business model'

So I asked him what was the problem and he said to me: 'Chris, as far as I can see it, we go in to a company, identify some technical, process, or product problems to solve, we implement the solutions and we get paid for that.' I confirmed with him that this is right, so then he said to me: 'so what happens when we've solved all of the problems?'; and yet of course this never happens.

One thing that does concern me is how many companies we speak to, whether explicitly, or not, appear to share this view. How many business in this room have a chief technology officer, or a technology director? You will all have an accountant, or finance officer, all an operations director and most a personnel, or HR manager, but technology is often either neglected, or restricted to the IT guy. This is a tacit assumption by the company that all of the problems have been solved and that there is no room for improvement. In the now famous words of Donald Rumsfeld, it is not the known knowns, or even the known unknowns that we need to worry about, but what of the unknown, unknowns? These are the opportunities for innovation and business improvement that are not visible to people working in the business, but where expert advice, or even just a fresh pair of eyes can identify an opportunity for improvement.

One of the key indicators of successful innovation in a manufacturing business is productivity and here the steel industry reveals an interesting example. In the period from the mid-1970s to the mid-2000s, productivity in the UK steel industry increased by over 500% and this was not achieved by a single step, but by continual, relentless, year on year improvement. These improvements are the real, tangible output of innovation.

Innovation needs to be managed. Like any aspect of business, the process of managing innovation is all about managing risk and the greatest perceived risk is that the innovation will fail and the investment will be wasted. There are many ways that this risk can be mitigated and for the larger company, scale is the obvious answer. If a company is typically engaging in twenty innovation projects, two fail and one delivers a value several times the cost of the whole programme, then the company can have the confidence to consider more risky and potentially more highly rewarding innovation projects.

For the smaller business this economy of scale in practising innovation is unlikely to be an option, but there are still measures that can be taken to reduce the risk of wasted investment. Typically an innovation project will start small and grow through various phases of development as it approaches implementation. By systematically breaking the project down in this way and rigorously enforcing a go/ no go decision point after each phase, the risk associated with the project can be significantly reduced and managed. A counter to this is the general unwillingness in some company cultures to stop an initiative when it has started, but so long as this can be viewed as a positive outcome, that has protected the companies' resources and allows other innovation opportunities to be pursued, there will be no damage to the momentum and willingness to pursue change in the business.

From what I have described, you can see that an essential component of successful innovation in a business is high quality decision making. That is informed decisions, where the conclusion accounts for the risk appetite of the business, the market environment, the views of the customers and an informed view of the technology with the relevant expertise. It really needs to be a combined technical, economic and commercial judgement.

In making such decisions about innovation and adopting new technologies, it is important to bring as much information as possible back in to the business, but once again there are pitfalls here that must be observed. Like a group of Lemmings heading towards the cliff, industries are not averse from adopting technologies and practices on a 'me too' basis, that either do not differentiate their company, or are not even necessary. An extreme example of this of course is the prevalence of bogus bomb detection equipment, now still prevalent in some countries and implicated in the less than adequate security processes at the airport at Sharm el Sheikh.

To improve the quality of information entering the business concerning innovation, it is possible to construct what is described as an 'Epistemic Community'. This epistemic community is a concept to describe the important influencers and thinkers in an industry. So instead of listening to all of the voices out there, listen to the ones that have a track record for being right. Who are the better informed journalists in the industry, for the steel industry the Sunday Times has a strong track record of sniffing out the truth, who are the competitors, academics, research institutes, customers, consultants, who really seem to know and understand the industry, the technology and new opportunities. Watch, listen and speak to these people and be prepared to consider and follow their views, even when it runs contrary to general opinion.

In any industry and for any innovation, adoption of that innovation follows a classic S-Curve amongst players in the industry. This means that when the leaders are adopting the innovation, no-one else is interested, they may even be actively hostile. The next group to adopt will be the fast followers, these are the well informed, the firms that don't just stick with the crowd, but they are also not exposed to the same development risks as the leaders. In time the bulk of the industry will follow and finally the laggards will adopt the new innovations, or gradually become extinct.

By watching closely the epistemic community around a technology, or innovation, by being prepared to adopt before your competitors and by knowing and understanding how to manage the risk around innovation in your business, it is possible to move out of the pack to make the innovation decisions that are right for your business and for your customers.

There are many tools, techniques and strategies available to manage innovation. If they are not familiar to you, if they are not used rigorously in your business, then ask someone to help you. If they are used, then seek to improve them. Innovating the way that you innovate can be a seriously effective way to increase productivity, or accelerate product development.

Finally and to sum up, I'd like to leave you with some straightforward practical advice, about how to get the best value out of innovation:

First of all start with information. Bring information in to your business, from trade bodies, organisations such as this, network, benchmark, be open to the fact that every where you look in your business there is the opportunity for improvement.

Next get the right capabilities in place to deliver a successful innovation. Nurture your own staff to challenge acceptance of the status quo. Serial innovators are restless and dissatisfied. Somehow you need to embed that attitude in your business and combine it with a focus on performance and financial results. However, most of all, no matter how big, or capable, or unique, your business is, recognise that you can't do it all on your own. The number of US patents has increased along an exponential path since 1790, but in the first half of the 19th century, half of these patents were for single, codes, that is entirely new technologies, nowadays, 90% of inventions are for combinations of existing codes. This means that innovation today is often about combining and transferring technology, to find new applications and develop new devices. There is no escaping from the fact that for your business to innovate you will need to collaborate, source, partner, or otherwise work with people and organisations who can help you. If you are a big company you may be able to manage these networks yourself, if you are a small company you may need a partner to manage these networks for you. Either way you need to draw the outside world in to your business.

Finally, innovation isn't free, but it must add value. Publically subsidised innovation, can be useful but only if it is supporting something that your business needs to do anyway. It is better to pay all the cost of an innovation project that you need than half the cost of one that returns half the value. If you are undertaking innovation projects and you can't see a return on investment that is a significant multiple of what you are spending, then do something else. The net benefit of engaging in innovation should be the release of cash to invest elsewhere in your business. That is the reason for doing it in the first place.

It is important to recognise that there will be innovations you can engage in that will bring a tangible difference to your business in the short, medium and long term, you just need to find them.

And this brings me back to where I started. In the good times anyone can make money. As an industry consultant put it to me once, in the up-cycle most people spend time over indulging at the buffet trolley, but when the down turn hits it is those businesses that find something extra in their processes, their products, or their customer service, that survive. The only way to do this and to do this differently to everyone else is to innovate. To innovate more, to innovate faster and to innovate further than anyone else, is the only certain way to grow and to sustain your business.

And with that I thank you for your kind attention.

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Chris McDonald is the Chief Executive Officer of the Materials Processing Institute. The Institute carries out industrial research and innovation in advanced materials, low carbon energy and the circular economy. Chris's background is in industrial research and manufacturing, where he has worked internationally. He led the divestment and return to independent, not-for-profit ownership of the Institute in 2014, the year the organisation celebrated its 70th anniversary.

In addition to leading the Institute, Chris provides expert consultancy support to companies, Governments and public bodies, in technology strategy and the technical due diligence aspects of mergers and acquisitions. He is prominent in the development of public policy, around innovation, steel and SMEs, where he works to support growth and inward investment. He is the policy chair for Innovation and Enterprise for the Federation of Small Businesses, a member of the CBI Regional Council for the North East and is the Innovation Lead for the UK Metals Council. Chris is also a member of the Steel Advisory Board for UK Steel (EEF).

A graduate of Cambridge University, Chris is a Fellow the Institute of Chemical Engineers and of the Institute of Materials, Minerals and Mining. He sits on industrial advisory boards at a number of universities, including Oxford and Sheffield.

He is often called to commentate in the media on innovation leadership and the steel industry.

“Chris provides expert consultancy support to companies, Governments and public bodies in materials, technology and innovation strategy”



Chris McDonald
Chief Executive Officer
Materials Processing Institute

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The Materials Processing Institute is an independent, open access and not-for-profit technology and innovation centre working with industry, government and academia worldwide. Support ranges from small scale, site based investigations, through to long term collaborative research programmes.

The Materials Processing Institute is expert in advanced materials, low carbon energy and the circular economy, specialising in challenging processes, particularly those involving high specification materials, high temperatures and difficult operating conditions.

The Institute has over 70 years' experience as a leading UK technology provider. Extensive materials processing knowledge is supported by state-of-the-art facilities with a broad range of equipment, from laboratories through to demonstration, scale-up and production plant.

Scientists and engineers work with industry and apply their expertise to develop and implement robust solutions to research and development and improvements for products and processes.

Expertise is spread across a wide range of disciplines, including:

- > Materials Characterisation, Research and Development
- > Simulation and Design
- > Monitoring, Measurement and Control in Hostile Environments
- > Process Development and Upscaling
- > Specialist Melting and Steel / Alloy Production
- > Engineering / Asset Management
- > Materials Handling
- > Minerals and Ores

Research and project management teams deliver support across a wide range of industrial and manufacturing sectors including:

- > Metals and Metals Manufacture
- > Chemicals and Process
- > Nuclear
- > Oil & Gas
- > Energy
- > Aerospace and Defence
- > Mining and Quarrying



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