



**Materials
Processing
Institute**

HARNESSING THE POTENTIAL OF INDUSTRY 4.0: SUSTAINABILITY, INNOVATION AND INVESTMENT

A Speech given at the Westminster Business Forum: Supporting UK
High Value Manufacturing Royal Overseas League, London.

12th December 2019



Thank you Rosa and thanks also to the Westminster Business Forum team for the kind invitation to come back and speak this morning.

You may have noticed from my biography that I lead the Materials Processing Institute, an industrial research centre specialising in advanced materials, low carbon energy, the circular economy and digital technologies. It is easy, particularly for industrialists such as me, to become focussed on technology, but today I would like to broaden the debate to two other areas.

First, picking up a theme from Stephen, digital technologies are more than hardware and software, they also need people and it is the people aspect that I want to highlight this morning. As someone who works in materials I also want to highlight the materials story in these technologies in the context of environmental sustainability climate action.

People

Starting with people, just as the first industrial revolution replaced muscle with machine, so this 4th industrial revolution is replacing minds with machine learning. The first industrial revolution transformed Britain and the world's economic output, but also led to societal disruption and the smokestacks of Victorian England. So think about the change today, and the work of a company like Boston Dynamics developing a robot to perform the basic human act of turning a door handle that looks part dog, part boa constrictor, working in packs and using computer vision to leap across boxes.

My approach to this shift from workers to algorithms is grounded in a sincerely held belief in the value of good work. Its importance in creating a sense of self-worth, of confidence and purpose. The cohesive way in which work holds our families and society together. I say this having experienced what it is like to live in a community where there is a lack of work, to live in a family where there is unemployment. At an individual level the change associated with these technologies and the threat of unemployment, causes stress and is contributing to a crisis in mental health.

As these new technologies have changed our economy, so the changes in economics are disrupting our society, with jobs in the Midlands and the North most at risk. If we pursue a similar course of non-intervention as we did with deindustrialisation, then regional inequalities will grow and society will become more unequal. This phenomenon is not new, it was also experienced in the first industrial revolution, only this time it is faster than before and reverses a trend of decades. For this 4th industrial revolution we need policies to ensure that that the transition for those living through the technological change is managed and positive.

Climate Action

In Spring 2019 I spoke at a conference here in London on net zero carbon and at that time, I don't think many people knew what net zero was. Since then we have had the Extinction Rebellion and the determination of activists such as Greta Thunberg, such that now, in the UK General Election, we have political parties engaging in a bidding war to promise a net zero carbon economy by 2050, 2040, or even 2030. But I am not only interested in what we want to achieve, but how, in a practical sense, we are going to achieve it. This brings me to the discussion on materials.

Harnessing the potential of industry 4.0 to deliver a zero carbon economy, requires zero carbon materials. Delivering the infrastructure of a zero carbon economy will require new renewable energy, electric vehicles and greater connectivity. It needs concrete, steel, copper and cobalt. All materials that are currently produced at a great carbon cost to the planet and, in the case of cobalt, at a great human cost.

Industry 4.0 technologies can be of great use to us here. My own Institute has recently embarked on a £10m industrial digitalisation innovation project, for energy intensive materials production, supported by the Made Smarter Industrial Strategy Challenge Funds.

Digital technologies are not only important in the design and development of alternative, zero carbon manufacturing techniques, but also in improving resource efficiency and delivering the circular economy. Some excellent work has been done in this area by Green Alliance, including in their latest report 'Building a Circular Economy' and I am pleased to see Libby Peake joining us here on the panel.

The reason why this is so important is that there can be no zero carbon economy without zero carbon materials and yet materials are the most difficult parts of industry to decarbonise, being both energy intensive and chemically reliant on carbon. Industry 4.0 technologies, particularly through the application of 5G and AI for instance, gives us the opportunity to improve reuse and recycling, but also increase resource efficiency.

Conclusion

In conclusion, Industry 4.0 has the potential to decarbonise our economy and improve our lives. But there are competing visions for the future of our society and we must ensure that people are not forgotten, that we avoid rising inequality and that we invest in to our communities. We can do this, by recognising that progress is not primarily about technology, it is first and foremost about people.

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, digital technologies and the circular economy supporting the materials, processing and energy sectors for over 75 years. Chris led the divestment and return to independent, not-for-profit ownership of the Institute in 2014.

Chris's background is in industrial research and manufacturing, where he has worked internationally. 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.

Chris has an interest in innovation management and industry dynamics and in addition to leading the Institute, he provides expert opinion and consultancy support to companies, institutes, Governments and public bodies in innovation and technology strategy and management. He also advises on the technical due diligence aspects of mergers and acquisitions.

Chris is prominent in the development of public policy, around innovation, steel, SMEs, where he works to support growth and inward investment. Chris is the policy chair for Innovation and Enterprise for the Federation of Small Businesses, a member of the CBI Regional Council and Shadow Monetary Policy Committee for the North East, the Chair of the UK Metals Council and a member of the Steel Advisory Board for UK Steel (EEF).

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

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Chris McDonald
Chief Executive Officer
Materials Processing Institute

Materials Processing Institute

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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