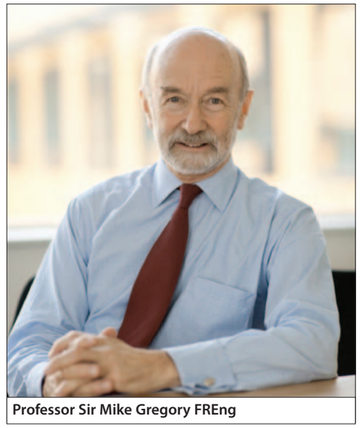
OPINION: UK MANUFACTURING ON THE RISE

The UK Office for National Statistics has measured manufacturing from industrial production as having increased in the first three quarters of 2013. It is hoped the manufacturing revival - dubbed the 'march of the makers' by the Chancellor of the Exchequer - will help to rebuild the UK economy. Professor Sir Mike Gregory FREng, Head of the Institute for Manufacturing, University of Cambridge, looks at current activity and pinpoints areas that should be considered when evaluating the success of UK manufacturing.



Professor Sir Mike Gregory FREng

So manufacturing is back in fashion! It has been a long wait, but all the signs are that politicians of all persuasions now agree that manufacturing is an important and somewhat neglected part of the economy. That said, how do we keep up the momentum? How do we use manufacturing to drive growth? How do we move from catch-up to leadership?

Early foundations were laid towards the end of the last government, and the coalition has delivered a series of Catapult centres including the first in High-Value Manufacturing. This network of centres, bridging the gap between research and industry, is supported by the government-funded Technology Strategy Board and a wide range of industries, and is creating a vibrant new interface between companies and universities. Meanwhile, the EPSRC's network of university-based Centres for Innovative Manufacturing is ensuring that the UK stays at the forefront of new developments in production as well as product technologies and systems. Taken together, these initiatives provide the UK with the basis for an outstanding infrastructure and capability to support modern manufacturing. The context and opportunities for manufacturing are better than they have been for decades.

So what more needs to be done to take advantage of these positive conditions? The recently published *Industrial Strategy: government and industry in partnership* and *The Future of Manufacturing* Foresight report (see page 6) point the way. These have much to commend them, not least the joint government-industry ownership of the strategies and the broad and comprehensive view of manufacturing adopted in the Foresight report. I would highlight four themes to which we should pay particular attention – *industrial systems, production scale-up, product-service systems and sustainability*.

The term *industrial systems* might be a better way of representing what we mean by modern manufacturing. We need to move beyond thinking about manufacturing as the shaping of materials and consider the whole system from understanding markets through R&D, design, production, distribution, service and sustainability.

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If manufacturing is about making parts, it makes sense to do that in the cheapest place: today that probably means China, but increasingly Vietnam and Cambodia, and soon, perhaps, Africa. If we are talking about the whole industrial system, we must think twice about leaving production to others. Production is a critical source of innovation, an opportunity to protect critical technologies and the means of capturing more value from the ideas for which the UK is rightly well-regarded.

Production scale-up is one of those under-appreciated capabilities in manufacturing. New and successful products can command premium prices, but any manufacturer wanting to make the most of this opportunity has to increase production rapidly. This is a traditional dilemma for manufacturing engineers. Over-commitment to capital expenditure on a product which flops is the road to ruin. Under-commitment means losing potential profits and the risk that fast-following competitors will steal the market.

Traditionally, scale-up has been the domain of tough project managers, and we certainly continue to need them. But we need to be smarter at R&D and design so that we develop products that are suitable for rapid scale-up to match demand growth.

Preparing for scale-up includes choosing product technologies that are inherently scalable along with manufacturing processes that can respond rapidly to changes in demand without requiring early commitment of capital. Finally, we need more sophisticated approaches to market-testing and feedback to maximise the planning horizon for production. With 'smart scale-up', manufacturers in the UK could capture significantly more value from their ideas.

Services, or more accurately financial services, have not enjoyed a good reputation of late. However, we should not let that blind us to the opportunities that *product-service* business models can offer to manufacturing companies. There are already famous examples including, of course, Rolls-Royce. There are many more: from flooring to pharmaceuticals, companies increasingly recognise that consumers may not necessarily want to 'own' the product (cars may be an exception for some people!). What customers really want is the service that the product provides.

This is an important message for engineers who are trained, quite properly, to create machines and systems with the highest performance. Still, it is worth remembering that the consumer may not want a higher spin speed but drier clothes, not a faster journey but a more comfortable and relaxing one.

The term *sustainability* can be applied to the environment, the economy, or individual businesses. The last two are matters for government and companies, but the first has broader implications.

While there is some disagreement, most informed scientific opinion is unambiguously of the view that human activity is having a measurable and damaging effect on the planet's temperature, with potentially severe consequences. These predictions might be wrong, but what could be worse than betting they are wrong, finding they were right and having missed the opportunity to reverse a damaging and potentially fatal change?

Engineers need to decide what should be done. There are, of course, some obvious targets – the rate of domestic consumption, the environmental treatment of existing buildings and the use of fossil-fuelled transport. Often neglected, however, is the role of industry. Engineers must design processes that are less resource and energy-hungry, build factories that are more efficient and, ideally, create streamlined industrial systems so that the 'waste' outputs of one process become the feedstock for the next.

Building on the current momentum, the UK is well placed to re-establish itself as an innovative trendsetter in manufacturing, showing how we can create wealth sustainably by providing the goods and services people need without damaging the planet – turning ideas and opportunities into products and services. That is the role of modern manufacturing.

BIOGRAPHY

Professor Sir Mike Gregory FREng is Head of the Institute for Manufacturing (IfM). Following an early career in industry, he was responsible for the Manufacturing Engineering Tripos, a senior undergraduate programme linking engineering, management and economics and with close industrial engagement. Subsequent developments in research and collaboration with industry reflected this broad view of manufacturing and led to the IfM's establishment in 1998. His work is closely linked with industry and government. He has published on manufacturing strategy, policy and international manufacturing.