CHAPTER THREE

Future Industry

Encouraging the technologies that will drive the next industrial revolution

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New tech is central to the knowledge economy and will drive the next industrial revolution. National policy must be oriented towards encouraging growth and innovation.



The failing

Policy is well meaning but must do more to support the growth of start-ups and to join thinking between the worlds of research and business – this ranges from policies affecting visas, to tax breaks for innovation, to more space for expansion.

Policy recommendations

- I. Business rates: A five-year business rates exemption for new knowledge-industry start-ups and all independent retail businesses located in high streets as well as a pause on charging empty rates on vacant buildings designated by councils
- II. Visas: Fast-track visas are essential post-Brexit for any company registering a patent in the UK in the last 12 months, as well as for all EU and international students graduating in the UK with degrees in key courses related to STEM fields – science, tech, engineering & mathematics (and medicine)

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Identifying the technologies that will drive the fourth industrial revolution

Anchored by the universities of Cambridge and Oxford, there has already been an explosion of high tech industry along the Arc this has been despite, not due, to policy and planning.

Now we must do everything in our power to protect, nourish, and replicate that growth.

The UK vision – according to the National Industrial Strategy – is to be the world's most innovative economy. To do that it aims to boost technologies in four key areas: Al/ data, ageing societies, clean growth and future mobility.

These encompass a huge range of technologies, but we should not be limiting ourselves.

Rather than focusing on what we want, we must focus on creating the conditions that stimulate tech growth:

- Dense business networks
- Competition and collaboration
- University and business interchange
- Access to finance and business supportStimulants for productivity and innovation
- Global market access

Policies, strategies, grants and facilities must replicate, support and stimulate these factors to enable more technological growth.

Enabling technology transfer – getting promising tech to the market

There is a gulf between the work of scientists, and that practically applied by engineers creating new products and technologies. The challenge is integrating the two and creating a culture of comprehension.

In America, President Obama started the National Network for Manufacturing Innovation, which created a series of innovation hubs where industry and research could collaborate. In the form of public private partnerships, everyone had a stake.

Along the Arc there are similar examples, though not on the same scale, while

university/private sector partnerships are still the exception, rather than the norm.

Enabling business and the private sector

Stateside, it was government grants that supported the initial discovery of the microchip and the internet, but the development was left up to the private sector.

The UK government should be looking to do the same now, supporting new technologies through grants, but leaving it to business to find the commercial applications.

This needs the right kind of grants but also the right kind of real estate, in a businessenabled environment where ideas and inventions are commercialised and spunout, and entrepreneurs are supported.

Much focus at the moment is on helping tech companies to access the increase in grant from the NIS. This is correct, but it must also look towards supporting later commercial applications.

Key industries along the arc



Aviation: Cranfield Aerospace Innovation Integration Research Centre, Luton Aviation Cluster, Midlands Aerospace Cluster, Marshalls



Life sciences: Cambridge Biomedical Campus, Babraham Research Campus, Oxford Science Park, LMB, One Nucleus, Oxfordshire Bio Network



Future energy: UK Atomic Energy Authority, Westcott Fuel and Battery Cluster, Cambridge Cleantec, Oxford GreenTech



Creative and Digital: Pinewood Studios, Cambridge Wireless, Microsoft Research Laboratory, MK Geek Nights, Cambridge Network, Oxfordshire Digital Spinouts, Bletchley Park



Space: Westcott Venture Park, Airbus Defence & Space, Culham Science Centre, Harwell Science and Innovation Campus



Future Transport: Race at Culham, Millbrook Proving Ground, UK Autodrive, Transport System Catapult



Advanced Manufacturing: Motorsport Valley, Silverstone Technology Cluster, Milton Park, Oxfordshire Cryogenics Cluster

Source: Economic Vision the Oxford Cambridge Arc



Case study: A new concept in personal air mobility

Volante Vision Concept is a near-future study that envisions a luxurious form of air travel in the shape of an autonomous hybrid-electric vehicle with vertical take-off and landing (VTOL) capabilities.

Launched at Farnborough International Airshow 2018 in partnership with Aston Martin, Cranfield Aerospace Solutions and Rolls-Royce, the aircraft aims to prove a new concept in personal air mobility for fast, efficient and congestion-free urban and inter-city air travel.

It exemplifies Cranfield's capabilities in combining cutting-edge research and academic rigour into real-world application through partnerships with the private sector.

Work from the consortium continues on the next stages of concept development with Cranfield University being the technology partner on areas such as the autonomous flight controls, connectivity and security of the aircraft. Digital aviation research at the university will also support how the aircraft fits into the wider transportation ecosystem.

Professor lain Gray, Director of Aerospace at Cranfield University said: "The research and development functions of the university are essential in enabling a holistic approach across the areas of aerospace, automotive and manufacturing technology for a design which encompasses so many different aspects".

The project also takes advantage of Cranfield's global research airport, being one of the few universities in the world to have its own airport, allowing the development and testing of airside and groundside technology.

"Volante provides a superb testbed in digital aviation, autonomous systems and the electrification of aerospace, and is an excellent example of how universities can work with the private sector to develop the technology of the future and put the UK at the forefront of new industrial development", added Professor Gray.

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Q&A: Roz Bird, Commercial Director, MEPC

What the most important thing to focus on?

The nub of it for me is "what do occupiers want? Where are they at the moment, and what will attract them to Silverstone Park?".

That's a constant evolution – there are some things that tenants always want, but also those that we should change. So it's a constant survey and having management staff on the ground is essential.

This means we need a range of space to help a business grow, and we also need to help companies attract and retain the best staff – because that's the most important factor for most companies.

What can science parks do to aid tenants?

Firstly we need to have a range of space, lease lengths and types. An established science park provides the full range.

Then there needs to be a heart, a sociability to the area, to encourage interaction but also create a community spirit. This can range from business events to TED-styletalks, football tournaments to on-site barbecues.

We should also think about facilities that can help tenants. We worked with Hexagon Manufacturing Intelligence to set up a metrology facility, that all companies within Silverstone Technology Cluster can access on an adhoc basis to measure and check. It's the sort of facility JLR has, but that small companies did not have access to before. I went round to the various companies on the park and asked what they wanted, and this came up. Smaller companies can now take on new contracts and work without having to lay out the expense of buying their own. Even now we have networking events around it.

What roles do universities have to play?

We need to be clearer about how we use universities and the private sector and in particular who owns intellectual property, because this can inhibit growth.

Universities play an essential role in training and attracting a group of highly employable individuals to a particular area, and obviously their research is invaluable.

However the way some university enterprise departments can be set up – and in particular their control over intellectual property rights – can strangle the ability of individuals to take their IP out and start up their own business.

Of course universities should make money from their research – it will in turn encourage them to do more – but we must have the right kind of policies in place to ensure it stimulates economic growth, rather than stifling it, and especially doesn't deter the private sector from working with them.

So there is a debate to be had about the role of universities in the knowledge economy, and in particular about creating clearer practice around IP to encourage research, but also economic growth.

Silverstone Park, MEPC

MEPC's Silverstone Park currently houses over 80 companies across 400,000 sq ft of space in the Silverstone Technology Cluster.

Started in the 1970s, the park has been built off of its racing and automotive history. A highly skilled staff base has evolved around the park and there are 3,500 high tech companies within a one-hour drive.

However, those companies now work in a variety of industries and the park has positioned itself to attract companies from advanced engineering to software development.

The park provides a range of space and lease types, from older cheaper space to brand new buildings, depending on occupiers and their stage of development.

At the smallest end, the park provides virtual tenancies and shared space, alongside flexible office and industrial units that can be rented on a monthly basis. Larger units are available for bigger companies, as is bespoke development. A further 2.1m sq ft can be built out.

MEPC has a management team onsite to help tenants and encourage interactions between businesses. Rent at the park is kept at market levels, to ensure high occupancy and keep it competitive with others in the area.



Geographical distribution of accelerators in relation to spinout companies from UK universities