

UNIVERSITIES AS INNOVATION PARTNERS

Beware the “cargo-cult” trap

interview:
Alan Hughes

► The true role of universities in fostering innovation is little understood.

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ON A RECENT visit to The University of Auckland Business School, the director of the Centre for Business Research (CBR) at The University of Cambridge, Alan Hughes, talked to *Business Review* editor Vaughan Yarwood about the role of universities in rebalancing national economies through innovation.



Business Review: Alan you have called the attitude of some people toward innovation policy in general a “cargo cult”. What do you mean by this?

Alan Hughes: There is a tendency in developing innovation policy to look to other economies that appear to be doing well, and I use the term cargo cult to describe the policies that emerge from that because it leads to the creation of certain structures which it is thought will deliver “cargo”. The analogy is with the Melanesian millenarian movements, especially in the post-Second World War period. After an era in which there had been occupation by American and other forces, which was associated with lots of material goods, millenarian movements developed that were based around the notion that if you erected runways and bamboo control towers and so on then the cargo would return from the air in the aeroplanes. But, of course, it didn’t. Those religious movements may have served other purposes but they certainly didn’t lead to material cargo and in one sense that is what has happened with a lot of innovation policy. Again, America is the economy that has been looked to, and certain things that have produced productivity growth, and which are attributed to the American economy, are then being copied, or form the core of policies, in other countries. And, typically, that hasn’t worked.

BR: So, what are some of the mistaken assumptions or conclusions that this modern cargo cult has given rise to?

AH: I think it all goes back to the mid-1990s when the American economy did experience quite a substantial increase in its rate of productivity growth. From 1972

to the mid-1990s productivity growth in the US was running at less than two per cent—well below its historic trend. But from the mid-1990s onwards its productivity growth accelerated to well over two-and-a-half per cent, which is its long-run historical trend before the seventies. And that came to be associated with three key things: first, the idea that this was based very much on small, entrepreneurial, high-technology businesses; second, that the high-tech sectors in general were fundamental to this; and third, that venture capital had played a critical role in the development of these firms by fostering a close link between universities and high-tech spin-offs.

BR: And all of these, you think, were wrong conclusions?

AH: Yes, I think that broadly speaking each of them was subject to very important conditions. If you look at the transformation of US productivity growth, one way of discovering what drove it is to ask which sectors contributed most to productivity growth and had the most impact on the economy. When you do that, you get some very surprising conclusions.

Robert Solow, a distinguished Noble Prize-winning economist, did this for the United States with some other scholars and what they found was that nearly all of the productivity growth was accounted for by retailing, wholesaling and financial services. Of course, they aren’t typically regarded as high-tech sectors. Who thinks of retailing as being in the

vanguard of technology? Those sectors were transformed by technologies, in particular by information technology, but the key is that it is the actual implementation of the technology that transforms productivity growth.

The second thing is this emphasis on what might be called the venture capitalist risk-loving view. If you look, as other people have done, at the funding for early-stage high technology in the United States, the public sector and large businesses account for as much as the whole of the venture capital industry put together. In fact, formal venture capital organised in markets accounts for less than five per cent of the investment in high tech. So, these investors are important, but they are fully matched by what the state spends on funding early-stage businesses through public procurement of R&D.

BR: And this is a legislated requirement, isn’t it, in the United States?

AH: Indeed it is. The federal agencies that carry out R&D in defence, health and so on are all mandated to spend at least two-and-a-half per cent of their R&D budgets on buying services from small high-tech businesses. And that is a very important distinction—they don’t give grants. There is a grant giving programme, but actually this is buying services. From the beginning, the businesses are selling in a market, albeit a public-sector procurement market. So the state becomes a big buyer and initiator of technical change.

BR: You have also looked quite deeply into the role of universities in innovation. How did you go about that research?

AH: It stemmed from a joint venture between MIT and the University of Cambridge. We established something called the Cambridge-MIT Institute. One of the tasks it set itself was to discover what it was about MIT that might be of interest and value in a UK context. So we set up a research project jointly with my CBR colleagues and colleagues at the Industrial Performance Centre at MIT to look at innovation and the role of universities in the two countries. We conducted a large national survey in both economies with about 5,000 firms in total responding on both sides of the Atlantic. We asked them who they relied on as sources of knowledge for innovation and then, within that, where universities played a particular role. So, initially, it was very much from the business point of view. More recently, we have completed big projects looking at all academics in the UK, for instance, and studying these relationships from their point of view.

BR: So, with those two very large research projects what did you find?

AH: The first point is that in both countries—and this is supported by a lot of other evidence—if you ask businesses what their most important sources of knowledge for innovation are, they don’t cite universities. The most frequent sources of knowledge are the business’ customers and suppliers. And, of course, that makes sense because you want to understand who can supply the components to you and to understand the nature of the market and what the customers want. Those drive a great deal of innovation activity. In both countries—and this is also true for Australia, Canada and elsewhere—universities are pretty low down the list. That doesn’t

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mean they are not important, but they are not the most important source.

The second point is that frequently they are used in combination with other sources. This is the really important lesson: that university and industry links are complementary. To get the most out of these relationships you need universities to be involved, but you also need lots of complementary investments by the business community to get innovations to market.

BR: There has been a move recently to try to increase the role of universities as drivers of innovation, but you are suggesting that it actually works in a quite different way. You have also mentioned that there are various pathways to innovation; that it already exists within universities in ways that may not be acknowledged. Can you talk about that?

AH: Let's take that in two bits: first, what do academics actually do and then what business values about what they do. If you think of a university as having four central roles, two of them are very well known and discussed—teaching and research. We produce a lot of highly-educated, highly-qualified individuals and businesses love the fact that we also do research. That is of great interest to business but it is of interest along with lots of other sources of knowledge for innovation.

But there are two other very important university functions of long standing which tend to be neglected. One of them is problem solving, and this is by far the oldest and most well-developed way in which universities interact with society at large, and with business in particular—through consultancy, sharing equipment, informal contacts of all kinds, but in a very focused,

applied area. It is not start-ups or licensing and it is not spin-outs, but it is a very deep set of engagements.

The other area, which is much softer but extremely important, we call a “public space” role. Universities in most societies have a rather privileged position in the sense that they can act as a relatively neutral ground on which various elements in society can meet. In a university-industry context, this means they can act as a meeting place between the local business community, national business leaders and the academic community—not just in the sciences and applied-technology subjects but across the whole range of disciplines.

When you look at what academics do by subject, it turns out that many of the arts and social sciences have highly valued inputs in all kinds of business activities. The role of trust in banking relationships, for example, is eminently a social science issue. So are questions about the kind of business models that lead to successful growth in high-tech companies. So I think the public-space role and problem solving widens the debate, not only in terms of the pathways but also in terms of the disciplines involved. That makes it a much wider canvas to paint on than a rather narrow set of patenting, licensing and spin-out activities linked solely to the sciences.

BR: You suggest that the real challenge is not changing a university culture to make people more engaged with industry, but developing new institutions that could enhance what already exists. What

would these institutions do; what would they look like?

AH: One view of what is required is to place more research grants in applied scientific research which, somehow, will lead to more innovation—in other words, “supply push”. The other side is “demand pull”. What is it that the customer—in this case industry—wants?

To cross the boundaries between these two groups you need a larger space in which interactions can occur, in which problems can be identified that are both of interest and soluble in some way by the university, and which are applications in a commercial setting. And that usually involves some kind of boundary-spanning institution that can be developed via this public-space role or that can be designed specifically in areas that may be of strategic importance for the country.

In this case you encourage a form of funding in which both business and the university sector are encouraged to play. Because the research is interesting, academics wish to do it—and typically they're interested in a wide range of applied problems anyway. But businesses are also encouraged to come and invest because they think there is a potential application. And you need the structure to be flexible enough for different industries, or different players, to come in and out as the technology develops.

BR: You claim that most policy makers over-emphasise the contribution of high-tech start-ups in innovation and economic growth, and under-value the role of both large com-

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panies and governments. What are the implications for New Zealand, a nation of mostly small and medium-sized companies, where traditionally government has favoured a hands-off approach?

AH: The third plank of the US story, which we didn’t really flesh out, is that if you look at how productivity changes over time, in most economies the bulk of productivity growth is driven by the largest firms. That is because they account for most of the outputs, so what happens to them has a lot of weight in the economy. Most small and medium-sized enterprises are typically involved in supplying the value chains of bigger companies, so rather than see a small firm versus large firm, it is more useful to see it in terms of who creates the whole value chain and where in that chain small businesses play a role. Then you can ask questions about whether you can capture a sufficiently large share of that for businesses to grow to whatever size is appropriate.

Now, although I have not studied New Zealand’s economy in depth, I think certain generalities will still hold. The first is that, like most economies, New Zealand depends on large companies for the final supply of many goods and services and most producers are in the supply chains of increasingly global multinational companies. That is a real challenge for university policy because, ideally, government wishes to encourage links between universities and industry to generate welfare in its own country. If small companies are generated from the

science base, or if businesses are developed which are then acquired, with the value going overseas, that is a major issue. So I would think that one of the key challenges is to find a way of making investments between industry and universities sticky in a New Zealand context.

The second thing is thinking through strategically which sectors, or which paths of development, might be appropriate for funding. And here I want to pick up something that you alluded to earlier—the idea that governments can’t pick winners. I think the better analogy is a racing one: that you can’t win a race unless you place bets. The real issue in an era of scarce resources is which races do you choose to enter and how do you place bets in those races? So picking winners is really all about choosing national champions in the form of individual companies. In contrast, placing bets—or making strategic choices—is about backing technological paths or sectors. That is a very important distinction and a fundamental insight into how to develop a science and innovation policy when resources are scarce and you need to make them count.

BR: There are a number of instances internationally—I am thinking of Canada’s Technology Triangle and the planned technology campus on New York’s Roosevelt Island—where universities are at the heart of collaborations for high-tech innovation. Is this an elaboration of your “public space” paradigm, or is something else going on?



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AH: The examples you mention are particular strategies designed to build intermediating institutions around particular kinds of university-based research. The significant feature here is that they explicitly include from the beginning a range of key major players in related sectors as well as developing a specific set of research-based activities linked to university academics. Thus, for example, in the recent case of New York’s Roosevelt Island, a critical role is being played by existing large corporates, such as Google, and at the same time a major attempt is being made to leverage charitable funding to help underpin the infrastructure and economic development. It is also significant in the New York case that an explicit link is made not just to technology, but also by reference to the connection between technological change and what are conceived of as being core elements in the New York economy in the fashion design and cultural areas. This aspect is frequently neglected in an emphasis on high-tech engineering spin-out activity as part of development plans.

BR: You say that businesses did not rank universities highly as sources of knowledge for innovation. Perhaps a more valuable role, for business schools at least, is as developers of an entrepreneurial mindset—one attuned to commercialising innovation wherever it may occur.

AH: It is true that when viewed from the point of view of the overall set of

knowledge sources that businesses access, universities are relatively low down the list. This does not mean that they do not have a distinctive and important role to play, but that in seeking to include universities in development strategies, it is important that all the other players in the value chain are capable of relating to the developments that might potentially emerge from university-based research.

This does not necessarily mean that the key solution is to convert all academics into entrepreneurs or that they should adopt entrepreneurial mindsets, but rather that there should be a set of institutional relationships that enable those who wish to do so to seize and develop such opportunities. Much more important, however, is that access to emerging new ideas should be given to those in the business and public sector who are ultimately responsible for innovation as opposed to the scientific and arts university communities who are best conceived of as being naturally inventive and not necessarily the best locus for commercialisation activities per se.

BR: If a competitive economy is one that enables companies to succeed internationally while supporting rising living standards at home, where do you see universities fitting in? Or are we misguided to look to them for help in lifting productivity?

AH: As I hope my answers to the various questions that we have discussed makes clear, my view is that universities have a central role to play in our society. That role is multifaceted. At

its heart lies the pursuit of knowledge and the education and training of undergraduate and postgraduate students. These things are central to the university mission and represent the key role that they play in our society. Educated citizens with a strong cultural and scientific understanding

of the societies in which they live are undoubtedly the key to driving forward social and economic welfare. That is a much broader perspective than a focus on the number of businesses directly spinning out from universities or the number of patents that they hold. ■



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KEY TAKE-OUTS

- Innovation policies are often based on mistaken assumptions about what really triggers economic growth in other countries.
- More important than entrepreneurial activity within universities is access to emerging new ideas for those in the business and public sector who are ultimately responsible for innovation.
- Developing a science and innovation policy when resources are scarce requires making strategic choices about which technological paths or sectors to support. It should not be about picking individual winners.