

Elements of attractiveness in the knowledge economy – reflections from Cambridge and Singapore. Presented to the International Association of Science Parks' Annual Conference. Bergamo 21st September 2004

Introduction

In preparing this paper, I have chosen two places in which I have had the pleasure to work in recent years. Cambridge UK is where I live. I have known the City and surrounding area since early childhood. Though I've lived away from the area during the intervening years, there's a danger that my perspectives are somewhat shaded by self-serving recollections. Nonetheless, what I shall say about Cambridge is based on some serious analysis and reflection on its economic and social evolution; grounded in the re-visit to the original *Cambridge Phenomenon* research that I and colleagues from SQW undertook some five years ago.

By contrast I'm pretty much an enthusiastic newcomer to the Asia Pacific region. I have undertaken review assignments to look at EC supported initiatives in Malaysia and the Philippines and had the opportunity to speak at fascinating events in China and, most recently Korea, but it is only in Singapore that I've had the chance to gain more than a superficial insight into the region's engagement with the knowledge economy. There, for almost three years, I have been fortunate to be a member of the international Resource Advisory Panel for *one-north* – which has involved regular visits to review that major development's planning and implementation.

In this paper I shall start with a short section comparing and contrasting these two nodes in the global knowledge economy. Then I will introduce Singapore's strategy to develop a global presence in bio-medicine and outline the physical development component of this, *one-north*, whose fundamental goal is to create a place that will be globally competitive in attracting knowledge rich activities and stimulating creativity. Next I'll turn to Cambridge U.K. which has a track record in being attractive to the various elements that make up the knowledge economy and is now dealing with some of the challenges that come with success and increasing scale.

Prompted by these two cases, the paper then goes on to consider what distinctive generalisations can be hazarded about factors making for attractiveness. Finally, in case my neck is still not stuck out far enough, I offer some reflections about possible implications for IASP members. I am not an academic and, therefore, do not presume to offer systematic references. It is, therefore, doubly important to thank the very many people whose ideas I have half remembered, bowdlerised and failed properly to attribute.

Cambridge and Singapore

Actually the two communities have quite a lot in common:

- each is pretty wealthy within its regional context (Singapore more so)
- both face development pressure on land resources
- there are common aspects to their legal, administrative and planning structures
- each has a range of international connections, including a significant tourism industry
- both aspire to create wealth from knowledge
- there are well-established and successful science parks in both
- human resources are an important element of competitive advantage for each community.

The differences are, however, more striking:

- Cambridge has evolved as a community over many years – the University dates back to the 12th century and the first glimmerings of scientific industry to the early 1890s. However, it has only recently developed its role as a regional administrative centre
- Singapore, an independent City State, is a brilliant modern creation founded on political will and vision
- Cambridge is constrained by the political and economic priorities and regulations of the UK and the European Union
- Singapore has many degrees of freedom for bold risk taking in charting its future
- excellence in scientific research in Cambridge has a long pedigree (Newton and Rutherford to name just two)
- Singapore's major investment to become an international node in the knowledge economy is very recent
- Cambridge's disorganisation may be more conducive to entrepreneurship than Singapore's efficient organisation.

Singapore and biomedical science

Singapore has a **highly planned** economy. Following thorough research into alternative approaches, strategic initiatives are agreed and buy-in is secured across all economic and administrative actors. In 1999 the Economic Development Board, which has shaped the growth of industry in Singapore over the past 40 years, announced a strategy for building a knowledge-based economy. Developing the life sciences is a key part of this and it is instructive to see the approach taken.

A National Biomedical Science Strategy was launched in 2000, with a systems-based approach to developing biomedical sciences in Singapore, comprising:

- a Ministerial Committee to ensure political consensus through policy and programme development
- an International Advisory Committee (IAC) through which key academic and industrial players were brought in to advise on worldwide research and industry trends, to offer critique on current initiatives, to guide development, and to provide ethical and legal inputs
- the Biomedical Sciences Group (BMSG) which provides planning and management across the entire value chain.

An estimated \$2 billion was set aside for the period 2000-2005 to fund new institutes, academic research and training, as well as funding and tax incentives for companies of all sizes, from start-ups to established multi-nationals. In addition, US\$600 million was made available for investments in world class firms carrying out R&D in Singapore.

The 'systems approach' included the three primary components that were deemed necessary for a biomedical sciences initiative to be successful. These were: provisions for infrastructure; tax and capital incentives; and education and workforce initiatives.

Infrastructure

Telecommunications and web resources were prioritised under 'Infocomm 21'. **Biopolis** within *one north* developed brand new facilities for biomedical and related research institutes, with some incubator and private-sector space.

Tax and Capital Incentives

There are a number of government tax incentive schemes and grants available to encourage biomedical science companies to locate in the region. These include grants for R&D and manpower training for the purpose of jumpstarting a local operation. Government will match corporate investment in research and development under the 'Scientific Capability Development Programme'.

Investment

Biomedical Sciences Investments (with total endowments in 2002 of \$682.3 million), makes equity investments in biomedical companies and biomedical sciences worldwide and in Singapore-based joint ventures and start-ups. One of the conditions of funding for overseas companies is that they should commit to setting up a joint venture or subsidiary in Singapore when they are ready to expand.

Education and Research Initiatives

Education initiatives have been introduced at all levels of the education system, from science events and focused curricula at primary and secondary level, to grants and scholarships for post-graduate study, including exchanges and industry placements. There has been a 50% increase in the number of university life-science enrolments since the implementation of Industry 21.

Government research funding is available for academics (of either Singaporean or foreign extraction) for up to 5 years. The BMRC recognises the time constraints on academics, and so has developed a submission system for research proposals that takes minimal time and paperwork.

Legislation

Having the correct legislation in place is seen as equal in importance for the development of biosciences to having a good infrastructure and a strong scientific base. Adoption of transparent ethical standards is also recognized as crucial.

Stem Cells and Cloning

Singapore has become a 'regulatory haven' for stem cell research, and is hoping to attract disaffected scientists who feel their academic freedom has been compromised by legislation in other countries.

Patents

Patents are granted for 20 years from date of filing under the Patents Act 1994. The patenting of plant varieties is permitted under this act. Confidential data/test data are protected under the Medicines Act/Control of Plants Act for a period of 5 years.

Intellectual Property Rights (IPR)

Initiatives taken in 1998 strengthened IPR compliance, leading to full compliance with the WTO's Trade-Related Aspects of IPR (TRIPS) in 1999. There are judicial processes in place to support IPR enforcement, and there are ongoing programmes to raise awareness and to educate the public about IPR protection. Moreover there is a good deal of credence that the laws will be enforced.

Health and Safety

Measures have been taken to move towards best international practice.

Good Clinical Practice

Singapore holds the secretariat of the Asia-Pacific Economic Corporation (APEC) Coordinating Centre for Good Clinical Practice. This promotes GCP, the training of clinical research personnel and the creation of a conducive environment for multi-site clinical trials in the region.

Capabilities to Approve New Drugs

The Centre for Drug Evaluation was set up in 1998 to deal with New Drug Applications (NDAs), and to provide pre-submission consultations on clinical trial protocols etc. Drugs take on average 8-12 months to gain approval, which compares favourably with regimes in the US, Europe and Australia.

Pharmaceutical Inspection Co-operation Scheme (PICS)

In January 2000 Singapore was the first Asian country to accede to PICS, an international body based in Geneva.

one-north

This long list of coordinated initiatives (and there are others that I have omitted) indicates what the Singapore Government, after intensive international research, thought necessary for Singapore to be attractive to the life sciences segment of the knowledge economy. I suppose many other countries have, albeit in a less deliberate and transparent manner, also sought to put these elements in place.

What really differentiates the Singapore approach is that they have identified the need to develop **a new 21st Century place** within which to house Biopolis (the physical catalyst for the life sciences strategy) and a second node, Fusionopolis, for the ICT and media cluster. *one-north* seeks to engender a creative buzz and entrepreneurial energy through the live, work, play dimensions of the place. JTC Corporation, the coordinating developer, says as follows.

one-north will be a new community of the new dynamic generation. A place where homes, offices, parks and commerce are mixed into a vibrant social melting pot. Somewhere you can walk to work, see a friend at lunchtime and share a meal. A fun place that is always pulsating, never dull and never short of ideas.

Chic apartments next to affordable DoBe lofts above a linear retail plaza, tropical retail Xchanges near open green spaces, arts and culture, sports and recreations, food for brains and

souls – one-north has a creative atmosphere which seamlessly integrates all the elements of the mix.

New communities will emerge around the ideas that create them. Flexible zoning will enable innovation and organic growth to occur. Fine grain mixed use will create dynamic interactions among the building blocks of one-north that are living, working, relaxation and discovery.

Through this approach *one-north* aims to broaden range of choices available to both Singaporeans and incomers. The aim is to attract international companies and their research teams; creating a place within which they can embed rapidly into the country's economic and social life.

Cambridge, UK

By no stretch of imagination can Cambridge claim to rival Singapore as an example of planning at its best. Until the last 5 years or so important aspects of the physical planning framework were, at best apathetic to building the city-sub-region's (Greater Cambridge) attractiveness for the knowledge economy. Nonetheless it has provided a positive setting for various strands of the knowledge economy which can, I think, be attributed to a combination of favourable factors:

- generally positive national factors in terms of fiscal and regulatory frameworks (including labour flexibility and reasonably liberal attitudes to immigrant knowledge workers)
- the breadth of excellence of research in Cambridge University and the government-funded research institutes in the area
- liberal policies towards involvement in entrepreneurial activity
- a scale of specialist labour market for researchers that is big enough to reduce risk (i.e. the costs of failure in an entrepreneurial venture)
- an attractive cerebral and physical environment
- specialist business services
- a good location relative to London
- the vision and dynamism of a small number of key individuals
- and, overall, the emergence of a positive Cambridge '*brand*' with connotations of advanced knowledge, strong economic growth and an entrepreneurial culture.

I can best draw these factors together through offering two quotations; one from an entrepreneurial scientist and the other from the head a major multinational.

Andy Richards, who has been a serial biotech entrepreneur and is now a Cambridge-based investor in new ventures, pithily described Cambridge as

“a low risk place to do a high risk thing”

Lord Browne, the chairman of BP, from the perspective of a company that sees developing and applying new knowledge as vital to its global operations, said

“(Cambridge) is one of the few places in the world where it is possible to gather people who are at the leading edge of different disciplines, present them with a challenge and, by solving it, break through the current limits of knowledge.”

At a less exalted level SQW asked companies that had moved to Cambridge why they had chosen the location and the most frequent reasons cited were:

- personal connections to the area (a founder or senior manager knew the area and was confident of being able to find their way round) 25%
- geography of the location 22%
- the area's good image/prestige 18%
- a customer base, links to a local firm etc. 17%
- Cambridge University 15%
- the area's skill base (of growing importance) 12%.

Whilst writing this paper, I cross-checked these findings against the views of a highly experienced official responsible for the practicalities of inward investment into the Greater Cambridge area. With the qualification that they had no experience of dealing with manufacturing companies (and that R&D companies may well come to the area through an acquisition), their list was as follows:

- proximity to relevant academic centres of excellence. In many cases, the inward investor will already be collaborating with a university group
- access to a labour pool with relevant skills and experience – usually PhDs but with industry experience
- proximity to a cluster comprising similar types of companies, research groups and professional advisers
- grants plus tax incentives (Cambridge actually has relatively little to offer)
- state of the art laboratories/offices – science park preferred
- operational costs
- networking groups.

It is encouraging for this audience that science parks figure in their list and perhaps noteworthy that there is now a ring of 10 genuine science and technology parks around Cambridge. I would argue, however, that recent experience in Cambridge bears out the emphasis that Singapore has placed on the importance of the place.

With the growth of the Cambridge cluster and the increased scale of research activity in the area there have been consequent pressures on the very resources that have made the Cambridge area attractive. To sustain quality it has become essential to move towards a more interventionist stance in terms both of the physical and social infrastructure and it is with comments on the latter that I will end this section.

Networking in Cambridge

Sir Alec (now Lord) Broers (until recently Vice Chancellor of the University of Cambridge) summed the position up well in his introduction to SQW's latest book¹; in which he says:

“In earlier years one of the city's great strengths was its local networking and this remains vitally important. What we see today is an equally vital and complementary enthusiasm for international links. I am sure that the years ahead will see us

¹ The Cambridge Phenomenon Revisited, Segal Quince Wicksteed, 2000. ISBN 0-9510202-1-8

collaborating – and competing successfully – with the other centres of excellence around the world. “

In the early years of the cluster it was the academic rather than the business sphere that had a developed infrastructure for networking and this included the Society for Applied Research – open to all with an interest in research whether from the business community or academia.

A subsequent initiative, Cambridge University Local Industry Links (1989), seeks to balance the learning and social dimensions of networking. CULIL runs a series of dinner seminars on topics of interest to business and academics alike – with three 20 presentations before dinner, followed by dinner and a general discussion. Topics covered have been diverse: new approaches to seed finance, international experience in fostering innovation; and doing business with China. There is usually a speaker from the University, from the local business community and from a non-Cambridge expert. The events are open to all (who pay!) and attendances are often in the 100-120 range.

It was at one of these CULIL events that the concept of the Cambridge Network was formed. Three of the attendees, the then University Vice Chancellor (Alec Broers), the serial entrepreneur/venture capitalist (Herman Hauser) and the ICT specialist (David Cleevly) from Analysys pondered together how networking in the Cambridge cluster could acquire a sharper business focus and greater inclusiveness. Their thinking was to:

‘create and support a community of like-minded people from business and academia in the Cambridge region and link this community to the global high-tech network for the benefit of the Cambridge region’

Cambridge Network Limited (www.cambridgenetwork.co.uk) was formally established in 1998 and has an inner circle of founder members that guide its forward development (and pay £5,000 per year) – these include major local firms, finance and other business services providers, Cambridge City Council and the University of Cambridge. But there are important ‘outsiders’ too, such as the London Stock Exchange, BTexact and Cranfield University.

The Cambridge Network undertakes a variety of activities aimed at encouraging both local business processes and global business processes. They involve both physical networking and activities in virtual space. Interestingly, specific efforts are made to involve younger entrepreneurs and a number of companies make a point of encouraging their younger, middle management, colleagues to attend CN meetings in Cambridge.

The emphasis on delivery is essential, because CN is funded by its membership (fees from £100 to £1,000 per annum) and sponsorship – so if it doesn’t deliver it dies. SQW pay £500 per year and each year I consider whether it’s worth it! Recent headline statistics are impressive with 1,300 members, 500 CVs and 1,100 jobs on the website, 2,500 visitors to the site each weekday and 50 press releases per week.

The Cambridge Network is particularly noteworthy because of its international orientation (there is a sister network in Munich and there is dialogue with both China and France) and the considerable importance ICT plays in the functionality offered to members and in the connectivity to others outside Cambridge. However, two other networking initiatives merit a

brief mention: the Eastern Region Biotechnology Initiative (ERBI); and a relatively new venture - Library House.

ERBI is a specialist network for the biosciences (which SQW was contracted to manage during its launch year). Whilst there is a strong concentration of new biomedical companies in Cambridge, the rest of the Eastern Region has significant complementary strengths: with major pharmaceutical businesses in Harlow and Stevenage; and plant biology (John Innes) focused on Norwich. ERBI has drawn these and other elements of the sectors together into an active, membership based network which has considerably raised the region's international profile and increased mutual awareness of strengths and collaborative potential across the region.

Library House is, by contrast, very much a private sector initiative to establish a profit focused company that maintains active intelligence on high tech firms. This company provides for its members – in return for quite hefty membership fees – detailed, independent (LH does not represent, or accept money from, entrepreneurial companies) verified, information on 'investable' businesses. The members are companies engaged in:

- investment – VC, banking and M&A
- advisory work around transactions
- technology transfer
- executive search and other specialist services.

Library House thereby acts as an active interface between Cambridge companies and the wider investor community that is keen to maintain a watching brief on Cambridge companies. It does so though a combination of face to face meeting and member access to a rich database on companies.

What conclusions can be drawn from considering Singapore and Cambridge?

Many of the crucial elements of attractiveness for the knowledge economy are not especially different from the factors that attract business in general – political stability, predictable macro-economic management, market potential, costs of production, de-regulated markets, communications infrastructure and the like.

There are, however, specific aspects that I think are of particular pertinence to the knowledge economy and in pondering which are the most crucial I'm sure that it is vital to keep in mind the central importance of people – more specifically talented people who may well be internationally mobile and, if so, have a global range of opportunities. Knowledge based companies can be expected to choose **places** where they can recruit knowledge workers; either because they are already present or because the place (as well as the money, job interest etc.) will be attractive to them. Moreover such places work best if they offer three kinds of space: private, public and appropriable – it is appropriable spaces (quiet corners of coffee shops for instance) that may well be most important for engendering interactions.

The second factor that I believe to be of differentially greater importance for the knowledge based economy is effective **networking** – both within the community itself and through connectivity with other knowledge-rich places. The academic community makes a significant contribution here (it was to meet their networking needs that the world-wide-web evolved), but so do internationally active companies – including accountants, lawyers, venture capitalists and other

business advisers. Through networking within the community the potential benefits of firm-specific international connections can be greatly increased.

I can perhaps bear this out by mentioning some of the personal connections between Cambridge and Singapore that I happen (without undertaking any research) to know of:

- Singapore's Senior Minister studied at Cambridge University, as did the Minister for the Environment
- the children of at least one other Minister were recently studying in Cambridge
- the head of academic medicine in Cambridge is a member of international expert group guiding Singapore's bioscience strategy
- the former Vice Chancellor is was a Visiting Fellow in Singapore and is currently helping to review the structure of higher education
- a Cambridge venture capitalist has developed links which have led to Singaporean investment in their latest fund.

Examples of international links such as these at the level of the individual can, undoubtedly, be given for many other places but I suggest that they are especially important for places that seek to be attractive for the knowledge economy. The point to note is that they came easily to Cambridge from its natural advantages; Singapore works hard to create them.

What are the pointers for science parks?

There seem to me three key messages for established science parks:

- first, they need to take active steps to link fully into their regional innovation systems and ideally become one its networking nodes. At the 1997 IASP conference in Trieste I spoke of tendency that maturing science parks have to become moribund. Since then the Cambridge Science Park has reinvented its importance by an imaginative investment in facilities to encourage social interaction and networking
- second, they should consider whether it is possible to become more permeable and move some way towards creating the 'buzz' that *one-north* is seeking to engender. Whether or not this is possible will depend crucially on their location and what development land remains available
- third, science parks should intensify their efforts towards international networking and helping their companies to network internationally. The science park manager needs increasingly to be a creative animator.

For science parks that are being planned it seems to me vital to consider carefully the arguments for and against a mono-cultural development and a separated environment. In some places that may still be the appropriate solution. The question should, however, be reviewed in terms not just of the science park as a bounded development in its own right but of the potential that it has for increasing the overall attractiveness of the wider communities to which it relates. It is in the self interest of science parks to increase the overall attractiveness of the places in which they are located – contributing, where possible, in terms of environmental, recreational and social assets.