Building and Managing the Constituencies: Requirements and Experiences

1. Mohammad Reza Haeri Yazdi, 2. Bob Hodgson
1. Magfa Information Technology Development Center (Iran), 2. Zernike Ltd (UK)

Abstract

In this paper the challenges of managing several key constituencies are described. Examples of existing parks are used to illustrate the challenge and to show the problems that were faced and the approaches that were taken to overcome them. Foresight, or similar longer term visioning tools are proposed as a strategy to develop the shared vision necessary to sustain efforts over the medium to longer time period.

The final section reviews key challenges facing parks with particular emphasis on:

the advantages and disadvantages of fiscal incentives

the role of regional hubs

the integration of national as well as city region bases

the widening range of tools that are needed alongside the S&T park to foster knowledge-based businesses

the role and contributions that have been made by universities and how can these be expanded in future.

S&T park constituencies

A science park is a property development, offering high quality solutions to businesses need for premises in which to conduct their work. It is also a key piece of a region's innovation infrastructure. These two aspects together mean that there are a wider variety of constituencies with a contribution to make towards the S&T park's successful implementation and expectations to be met from the benefits flowing from the development. At the most aggregate level there are three major constituencies – business, academia and government – but even within each of these constituencies there are a variety of distinctive interests and capabilities to manage.
So, within the business constituency there are the:

- property developers – who want to develop a successful real estate project so look for premium rents and high occupancy, and long term capital gain from their investments irrespective of the science content
- tenant businesses – who want an efficient place to do their business with property and facilities that meet their needs and remain affordable
- business service providers – who look to capture science park tenants as their clients because of their potential growth prospects
- financial services providers – who wish to lend to good tenant businesses and potentially take equity stakes in those businesses set to grow quickly
- technical service providers – who are potential tenants of the science park, potential service providers on new product development aspects of business, for example, and a source of many new business ideas.

An example of the property developer can be seen in the case of The Bridge Development (www.thebridgedartford.co.uk) which includes the London Science Park at Dartford in the UK.

The local authority want to develop a new economic base and have a very large site with excellent transport links. A deal has been agreed with a major developer – Prologis – who will develop the whole scheme with housing, distribution centre, an innovation centre and the science park. They make their profit from the housing and the distribution centre and "pay" for the opportunity by developing the less than commercial elements of the innovation centre and science park.
The dilemma in the case of the business service providers relates to their presence on the science park – they are not "scientific" and do little R&D so why should they be allowed on the specialist park. Their presence needs to be managed but they do potentially contribute through specialist services to other firms and by paying premium rents. A good example of the synergy model is shown at Taguspark (www.taguspark.com) where the ICT departments of several commercial banks have located on the park as well as a number of business services in the Nucleo Central building.
The synergies from the technical service providers is best demonstrated in the Tecnalia model (www.tecnalia.com) on the Basque network of science parks in Spain.
Within the academic community the distinct interests are:

- university administrators – who wish to gain from the development with which they are associated in real money terms as well as through enhanced reputation and collaboration opportunities
- academic researchers – who would like funding from tenant businesses for their research, potential clients for their knowledge and potential commercialisation partners for their findings
- teachers and trainers – who want to build links that will give them relevant course content, provide experiential learning opportunities for their students and high quality jobs for their graduates.

Examples of the first level of interest are shown in the various developments round Cambridge where the developers (St John's College, Trinity College, Peterhouse College etc) acted on the basis of creating an appreciating asset and a strong revenue for the colleges. A similar approach was taken by the University of Surrey in the Surrey Research Park in Guildford (www.surrey-research-park.com) where the park generates a significant surplus each year that is dedicated to university activities.
The University of Valencia in Spain provides an example of the second and third case where the key interest of researchers and teachers was a major incentive for the development of a new science park. The interest centred on the number of PhD students who were graduating and were not able to be absorbed into the faculty because of the halt to expansion of universities in Spain as a result of demographic changes. Attracting firms offering good jobs to graduating PhDs was, therefore, a key driver for the development. A similar but more research partnership motivation was behind the earlier science park at University of Alcala de Henares near Madrid which was one of the first campus based science parks in Spain.
Within the government the range of constituencies include:

- central government interests – which emphasise inward investment into the country, fast growing high quality jobs and firms, and broader improvements in competitiveness and a growing tax base
- local or municipality interests – where the emphasis is on a new impulse to the growth of their city, new clients for municipal services and revenue from both service and land based charges
- sectoral or line ministry interests – which emphasise cluster linkages in their area of operation as well as having potentially a need as clients for products and services that might be produced by the innovative companies on the Park.

At the national level the development of Sophia Antipolis in southern France was one of the earlier examples through the promotion of Senator Pierre Lafitte in the 1970's and 1980's. École des Mines was relocated and many blue chip multinationals were attracted by the quality of life

offering at the new science city in the Antibes. A different but similarly motivated model was a Hinchu near Taipei in Taiwan where the target was West Coast USA based Chinese technology entrepreneurs who were attracted back to build a local semi conductor and related sector.

Local and municipal interests are regularly found as partners to both positive and negative effects. The Bridge project mentioned earlier was sponsored by the Dartford council for many years, as was the Taguspark project by the Oeiras municipality. An example of the negatives can be seen in the Northern Regions of Portugal where the regional and local authorities made a mess of developing a planned three pole park on three sites around the region. The site selection bowed to local interests and did not properly fit the purpose so little meaningful has emerged even though it was being planned at the same time as Taguspark in Oeiras.

Some S&T parks have been developed with only one of these interests to the fore while others have been at both formal and informal levels combination of all. Where the latter is the case the challenge is to manage all these interests, and to get the maximum possible contribution from each. This requires active and sustained efforts over a long period.

As a concrete example of the issues that can arise it is worth exploring the experience of one science park that is now one of the most successful in Europe but had a difficult period in its earlier years when the tensions between different constituencies caused problems.

The park was constituted in the early 1980's as a not for profit foundation, had significant shareholding from the metropolitan municipality, the leading national university, the national research council plus a smaller shareholding by a group of large companies and a group of small companies. The building was initially funded by a private developer, on land adjacent to the university provided by the public sector, and the science park took a head lease and let the premises to tenants at a higher rent with the margin being used to fund their business development activity.

The original drive to establish the Science Park had come from the Rector of the university who had seen similar developments at peer universities in the US and in larger European countries. He had brought together the constituencies and assembled the funding package to establish the park and had a vision of the university being the font of new technology businesses and of his academics engaging with businesses in relevant advanced areas of knowledge. All then seemed set for a very positive impact with support from all the right quarters to achieve the vision. The Park attracted an interesting base of tenants with researchers, businesses and a small incubator all operating successfully.

But things then started to go wrong. The key change was that the Rector lost the election among his colleagues to retain his position and a new Rector was elected. Importantly the new Rector was not a supporter of the new mission of working with business and as a traditionalist supported the view of universities needing to focus on their core mission to teach and research only. Effectively, this put a large blocking barrier both in terms of the leadership of the Board of the Science Park and the linkages that were being planned between the Science Park and the University. The block was essentially a passive affair ie no support rather than active resistance but did mean that a great deal of energy was needed to achieve any of the more innovative aspects of the Science Park's mission. None of the other shareholders stepped forward to provide the strong leadership that was needed to encourage changes and everything was left to the management team to maintain and pursue the vision.

The absence of a formal support from the university leadership meant that the connections to the academics became dependent on the support of individual researchers who were personally interested and who were prepared to act outside the prevailing mood of their traditional colleagues. The national research council provided some support by agreeing to one of their research institutes taking up residence in the Science Park and the municipality continued to be supportive in a passive way rather than taking up the vacuum of leadership that had been created by the shift in position from the University.

After several years of difficult survival on the rent margin between the head lease and the rent charged to tenants a crisis was faced by the management team when the initial investors declared his need to sell the building in order to realise the higher capital value of the full Science Park building. Eventually a resolution was found with the new private owner of the building choosing to maintain their support for the financial model on which the Science Park depended.

Additional support was organised for an incubation activity to foster new technology based companies from a discretionary public programme which was subsequently generalised to be offered through the growing number of science parks in the country that had been established during the late 1980's and early 1990's. Small initial successes in creating largely ICT based companies helped sustain support for the Science Park management team who were increasingly seen as the real leaders of the project.

It was almost a decade before a new Rector – the third since the initial change described above – felt sufficiently committed to again offer positive support for the Science Park from the University. This was crucial to the expansion of Park to a second phase and the improvement in the financial position of the Park. The second phase doubled the size of the science park and the financial package was changed so that the Park became a significant part owner of the second phase development so had the beginnings of an asset base as well as a larger margin between its income and costs on which to develop its programmes. The park being described is the Oslo Research Park (www.forskningsparken.no).

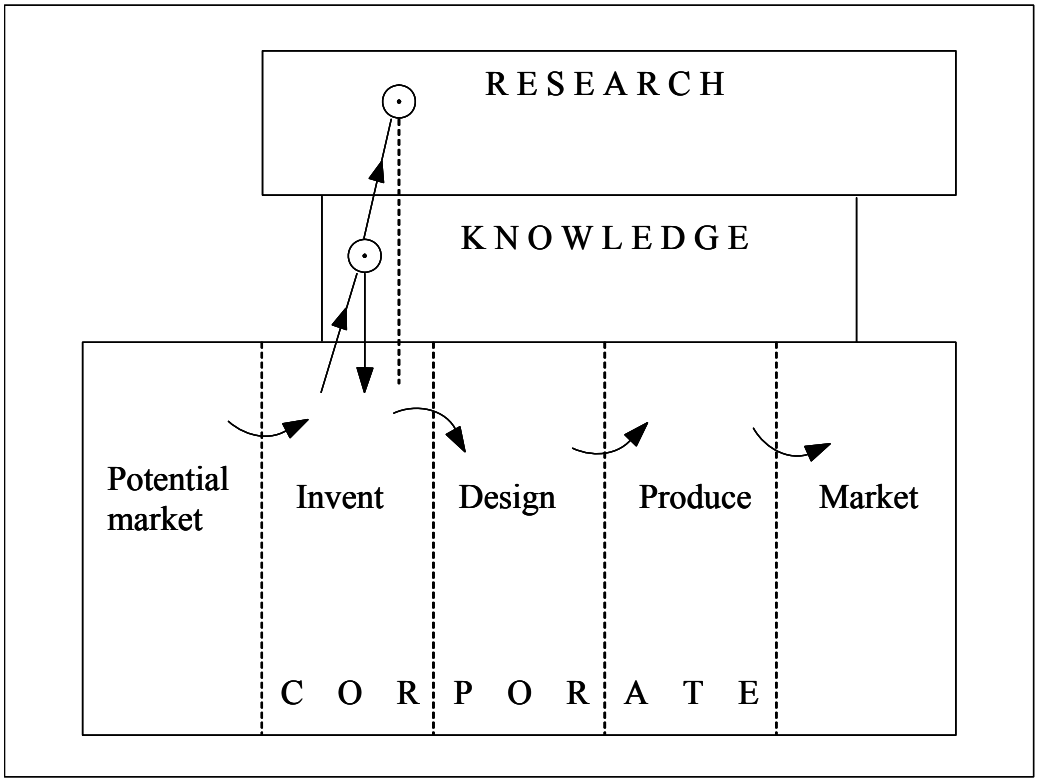
The key lesson from this story is the need to secure broad and active support from all the constituencies to ensure the project is not vulnerable to a swing in vision from one of the leading supporters. Leadership was shown – from the Science Park manager and his team rather than the shareholders in the project – and after a difficult decade the Science Park is now at the hub of a really exciting innovation cluster with linkages and widespread support from all the appropriate constituencies.

There are other stories where leadership has been absent or where there has been conflict between different constituencies as well as within constituencies and where momentum has been lost or projects have failed. In one Park, which is now also a major success story, there were two years lost because of political infighting in the Government constituency, in another, there is still an issue of lack of support from the business community for a development that is seen as too academic to be useful.

One tool that has been used to build the broad support for a multi constituent initiative like a science park has been some form of Foresight programme. Foresight is a participative exercise where the main constituencies take a long term look – usually between ten and twenty years – at the changes that can be anticipated in needs – economic, social and cultural – and the role in meeting these changing needs that can be expected from developments in science and technology. The science park is then placed in the context of a scenario of change and a broadly supported vision can be developed regarding its role and contribution. Even then there is a critical need for leadership to ensure the vision is maintained over the often long term that it takes to achieve development. But with a strong shared vision of change it is easier for leadership to be a collective activity rather than dependent on one key individual or constituency.

Technology commercialisation models

A useful approach to guiding the building of a common view of the purpose of the science park can be derived from an examination of its fundamental purpose. The longest established model of Technology Commercialisation, which is usually one of the central themes of science park developments, is that developed by Kline and Rosenberg which is shown in Figure 1.



Reference: Kline, S J and Rosenberg, N (1986) – 'An Overview of Innovation' in National Academy of Engineering – The Positive Sum Strategy: Harnessing Technology for Economic Growth – The National Academy Press, Washington DC.

Figure 1

The three key insights here are:

- first, knowledge is different to research and is both more easily accessed and more likely to be useful within the time frame of a business
- second, that the business sector is itself a set of distinct activities that need to interrelate with strong information flows
- third, that there are lots of feedback loops at play both within and between the different actors.

When using this as a tool to construct a view of how to approach a new science park scheme and begin the building of a common vision an example is useful. Below is the diagram suitably adapted to Hong Kong when the situation there was analysed as part of the design of their science park during the 1990's.

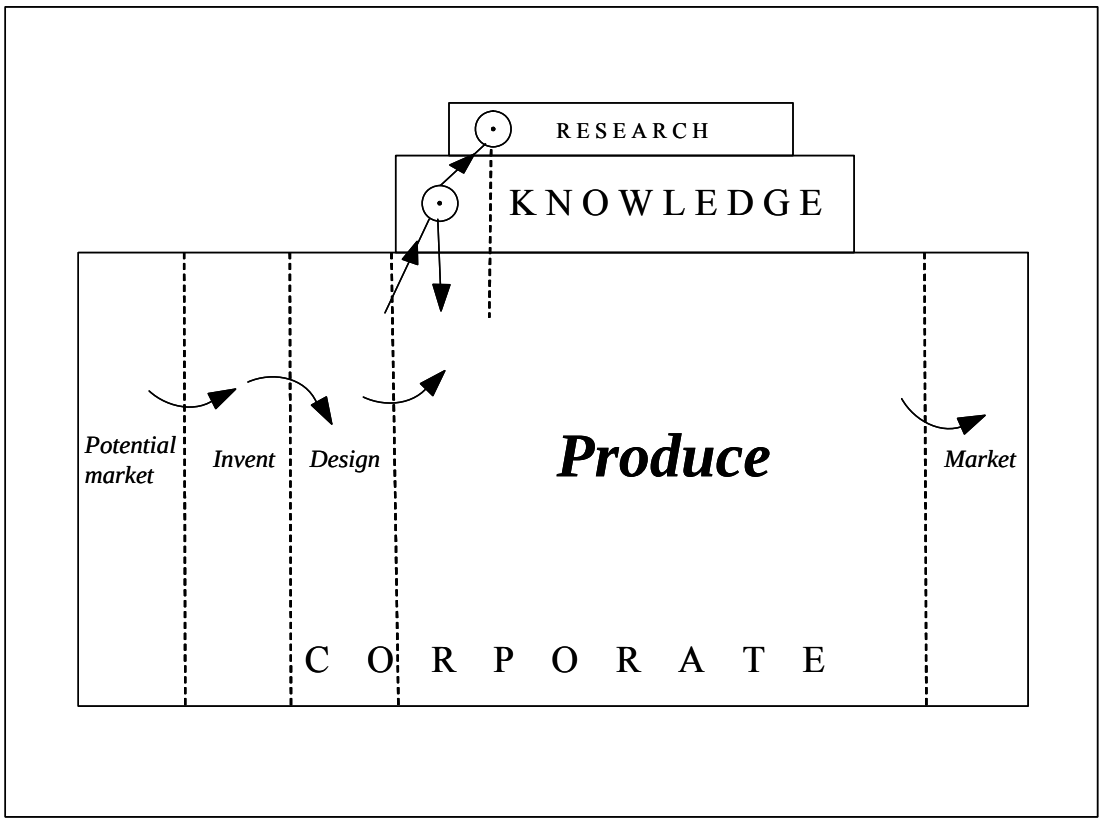


Figure 2

It graphically illustrates the strength of the commercial manufacturing sector but poor level of development of the other elements – most notably the R&D activities in the knowledge base and the higher level headquarter function in the business base. The science park needed to be matched by programmes to develop a stronger R&D capability and a stronger knowledge management capability in the business community before it could be developed successfully.
The role of a science park in terms of this model is principally to improve the scale and pace of interactions between the knowledge and research constituencies and the business sector. It is designed to achieve this by co-location of R&D in both academic and commercial sectors so easing communication difficulties and to improve exchange in R&D performance in the commercial sector again through co location. To achieve this, of course, there has to be an academic sector and R&D performers available for co location even if they have not necessarily been resident in the area prior to the science park being developed.

Key challenges

As the science park model has changed a greater role has been sought regarding the second dimension of S&T Parks namely as an element in an innovation infrastructure supporting the growth of knowledge based businesses. With this more integrated innovation infrastructure model in mind there are several additional policy and operational aspects that need to be considered for the future. Five of these are discussed below.

Fiscal incentives

Special Economic Zone, Free Trade Area and other designations have been used frequently to attract mobile investment in knowledge based businesses and so constitute an important sub group of competitive science parks. In some instances the target has been international investment, such as the Chinese special economic zones, while in others it has been part of a domestic clustering

strategy, such as in Turkey. In one instance in Turkey – the Marmara based Tubitak national research centre – there has been both a Free Zone and a Technology Zone developed with different packages of assistance and different targets for investment that are only separated by a road that leads to the entrance of both zones.

A current initiative of interest is the development of Special Economic Zones in Russia where four have been selected after a competitive bidding process to be located adjacent to centres with a strong science base with the purpose of developing new knowledge based businesses. The zones are located in St Petersburg, Tomsk in Western Siberia and in two science cities close to Moscow, the first based on electronics at Zelenograd and the second at Dubna a nuclear research centre. Strong fiscal incentives are being offered as well as reductions in the application of administrative rules and requirements. A challenge being faced is the development of strong linkages between actors in the established technology and innovation system with companies that choose to locate on the zones and the equity of treatment needed to incentivise those on the zone and those outside the zone to achieve common goals.

In general this sort of dilemma arises because there is a contradiction between the philosophies of a special incentive zone, which has a predominant enclave character, and science and technology parks which should have an open networked culture as a key node in national and regional innovation infrastructure. So incentives must be used cautiously so as not to undermine the impact of science park based companies on domestic innovation potential and to develop suitable inter firm exchanges among science park based firms.

In practice, however, if there is a need to compete in the international mobile investment arena then zone incentives will have to match the best available. They should be clear and predictable rather than vague or discretionary and the process of application and approval should also be transparent and simple. Once captured every effort should be made to root the mobile investment in the real economy as there is a significant experience of subsequent relocation when other locations offer a new incentive package at a time when the offer at the original location has expired. The key element to work on in rooting the companies in the zone is the quality and productivity of the labour force as they are much more difficult to shift to a new location.

Regional hubs

Some locations have successfully established themselves as hub locations to service several country markets from a well functioning business base. Two particularly relevant examples are Singapore over the last 50 years and more recently Dubai with its attraction of particularly ICT based enterprises. Typically, they are relatively small economies, surrounded by resource rich neighbours and have captured largely business oriented activities rather than those with a science orientation. Blue chip technology based businesses are attracted by the security and high quality of infrastructure that enables them to attract good quality of staff and attain high levels of productivity.

There are mixed views in the neighbouring countries on the equity of these regional hubs as they are seen sometimes as undermining the potential opportunities for their neighbours to capture mobile investment. There has certainly been some tensions relating to this aspect between, for example, Malaysia and Singapore, and a strong competitive response made to establish an alternative location – in this case both the long established free trade zones and the more recent super corridor initiative.

A more positive response can also be made when their neighbours seek to take advantage of the close by location of representatives of global technology players and build linkages to them from their domestic market. This is potentially relevant to the Iranian IT development momentum which is currently complicated further by geo-political tensions but must look to build linkages with Dubai.

Singapore has taken the strategy a further step by going backward into the supply of high quality technical staff from the domestic market and by building a domestic scientific research capability. In this way it is both beginning to develop its own knowledge based businesses and improving its chances of retaining the mobile more commercially oriented international businesses its incentives

packages have attracted. Its starting point was the existence of a strong higher education institution but it has invested heavily in extending this to good effect.
One of its latest strategies is to set up what it is calling an International Incubator which is a service centre in which are to be located representatives of many regions and countries in a brokerage relationship where they are to be encouraged to develop trade in intellectual products and services bilaterally and multilaterally. The appeal is to economies of scale and the creation of a more effective market place where capability to supply can be displayed and needs can be identified to stimulate interest. Whether this model can be effective is yet to be proved but it is an interesting development and a recognition that knowledge is an international good that benefits from trading internationally.

Integrated National Science Park system

Various strategies have been developed to combine the power of specialist science parks into regional and national networks and so to articulate better innovation systems. An early attempt along these lines was made in Japan with its Technopolis strategy which was motivated by regional development concerns to spread knowledge economy opportunities around the country. Some progress was made but the original project goals were significantly reduced during implementation. A similar motivation, but differently implemented, underlay the strategy followed by Norway in placing key S&T infrastructure, for example, the national engineering research agency SINTEF in Trondheim well away from metropolitan Oslo.
Two examples that are worth exploring more fully are, first, the Finish case – which shows what can be achieved by a well articulated innovation system where S&T parks have played a strong role. Indeed, the Technopolis brand is now being exported to neighbours, looking for linkages in the technology based zone in St Petersburg. The second example, is the integrated approach being followed across the Basque region of Spain where again innovation infrastructure is being concentrated in the region's science parks and a strong cooperative culture is being built in support of world class technology impacts on the region's knowledge based firms. This is being further reinforced by the amalgamation of the applied research institutes which have combined into a single entity (www.tecnalia.info) with sufficient critical mass to offer genuinely leading edge research capabilities to member firms.
There are also interesting developments at the international level with a variety of "soft landing" or "reception" centres being developed to provide a window and an entry point for smaller firms who are beginning to look at the international market. Again, S&T parks are taking the lead and looking well beyond their own region to become ambassadors and reception centres.

Additional tools

With the broadening role of S&T parks to take centre stage in efforts to stimulate the knowledge economy there has been a recognition that the property and initial service offering of the early parks is no longer sufficient. In part the pressure is coming from the government constituency but it is also relevant to both the academic and business constituency. As a consequence there has been a trend to integrate within the Science Park offer a range of additional business tools. An early example was the Incubator which has itself moved from a property offer to an integrated approach to the creation and more rapid growth of new knowledge based firms. The next step was to get involved in the cluster based approaches where a variety of animation activity has been instituted to move from collocation to cooperation strategies for residents on the Science Park. A further step was to put in place some sort of venture funding offer – often through partner organisations but sometimes as a division of the S&T park management team. And finally, the active promotion of technology transfer between partners both resident on the S&T park and from elsewhere within the zone of influence of the Park.
The latter function has been more commonly found on S&T parks that have a strong leadership from the academic sector and have also been commonly associated with active student placement

and exchange programmes, typically but not exclusively at post graduate level, between companies and the academic institutions.
In relation to the effective articulation of the innovation system all of these activities and tools have a key role to play and S&T parks have a contribution to make. However, care has to be taken to ensure that there is a real competence to run the extended activities and that an appropriate delivery strategy is adopted. Probably the most effective is to construct partnerships with agencies in both public and private sectors that have existing expertise and genuine experience so as to avoid the extended period of learning on the job that often characterises agencies taking on new roles.
Managing multiple agency provision is also challenging, and hence the tendency to try and keep control by taking on the responsibility internally. But this should be avoided if there is not to be a mismatch between expectations and achievements.

University roles

Much more is now being expected of universities in the modern knowledge economy and their roles as key constituencies of S&T parks is being supplemented by delivery expectations of new economic activity based on the commercialisation of research results. In many of the early university led, and in some cases University owned, science parks there has been a strong rhetoric of linkages and the commercialisation of research findings. Criteria were often specified that tenants should have active linkages with the sponsor university and in some cases this became embodied in the membership definitions of national S&T park associations, such as UKSPA. In practice, however, many of the linkages were of a more social nature – use of sports and cultural facilities – rather than relating to core research strengths of the university and involving faculty is business roles alongside their academic duties.
In relation to the core stated purpose of many S&T parks to commercialise research findings the performance is even less impressive. For example, in Cambridge, an acknowledged European centre for high technology based business that has grown from a university city, only about 6% of the new technology based firms can be traced directly back to academic research. Many have been started by alumni of the university but they have usually gained considerable commercial experience after graduating and before setting up their business rather than coming direct from the university into business. In most places the direct flow is even less than that of Cambridge and the reality in the vast majority of cases is that there is little direct commercialisation of university research findings.
This is not to say that universities have not been important – they are crucial to the whole exercise. What they contribute essentially is a flow of young trained minds and a reservoir of knowledge that has commercial value. Research is the exploration of what we do not know, knowledge is the codified form of what we do know and a focus on accelerating the flow of knowledge is much more relevant than a focus on the less certain and usually longer term processes of research. This flow is usually achieved through people with a long tradition in many places of faculty members taking advisory positions in businesses where their knowledge is relevant. Student linkages, especially at post graduate level have also been important for some time with a variety of extended training or project based linkages structured into their courses. These types of activities are not exclusive to companies on the S&T parks but there is an advantage from collocation that tends to favour those who are nearby.

Summary

The presence of multiple constituencies and the normal association of multiple objective mean that there needs to be active management of the constituencies that make up the S&T park initiative. Initially there is often great reliance on the energy and commitment of a senior champion for the establishment of the Park but there are several examples where the champion becomes a constraint or where over time their commitment ebbs. To avoid loss of momentum it is essential that a clear shared vision of the project is developed across the whole constituency base and that this is explicitly agreed and placed at the centre of management efforts to monitor performance and

evaluate achievements. The Foresight tool is proving worthwhile as a technique to develop this shared vision and should be considered a key requirement from the start. One of its major advantages is the long term perspective embodied in the technique which matches the need for a long term view of the development and objectives of most S&T parks. In setting out the objectives of any park care is needed to select the right solution with respect to several design parameters where choices need to be made. These relate to fiscal incentives, network development roles at regional and national levels, additional tools that complement the contribution of the park in achieving development objectives and an appropriate placing of the contribution of the various constituencies, among the more important of which is the partner university or research institute.