**Title**

Technology, market and company journeys: how can we help them succeed?

**Session**

New frontiers for STPs.

**Author**

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**Executive summary**

The science park movement has evolved from providing passive property developments to locations that have become active parts of the infrastructure that contribute to economic development by utilising knowledge outputs.

This transformation has involved developing a number of strategies. These include the refinement of the range of business development programmes on offer which includes pre, full and post incubation activities as well as working their way into developing and influencing regional development programmes such as innovation systems.

In addition to the value of the physical assets that create the focal point of science parks their importance derives from the combination of stakeholders each of which has their own value propositions, the presence of on site management and an association with a host that generates skills and technology.

The presence of this management has enabled pre and full incubation to evolve into a much more effective process; however, the process still has significant room for improvement. In addition this management provides the resources for closer engagement in developing regional innovation systems.

This paper discusses a number of the strategies which have developed as part of this shift from a passive role to offering highly serviced space that is aimed at pushing the frontiers of business development by facilitating the technology, market and company journeys of new businesses and how these may be improved.

**Introduction**

Stakeholders in science parks usually include government at varying levels from national to local, tenant companies, private investors and host organisations. The value propositions for each of these stakeholders vary significantly but it is the combination of these different interests that give to science parks both their importance as projects and the capacity to continue to evolve and push the frontiers of their influence.

Details of these different value propositions broadly reflect economic development for government, gaining a competitive advantage for tenants and technology transfer for hosts.

To deliver these propositions and to fall within the definition of a science park these projects must have active management on site and be associated with a host organisation which is a knowledge generator.

**Science park management and new frontiers**

Combining on-site management and with the value propositions of each of the stakeholders and the resources and influence of each of these places science parks in a unique position in the property market because it helps them to:

- Develop, support and refine pre, full and post incubation activities.
- Share their experience of planning, developing and operating these sites to help them professionalise pre and full incubation programmes in order to improve their capacity to support company development.
- Extend connections to spread the scale and capacity of the network from which to draw technology on which to base the commercialisation process offered by business incubation.

- Work outwards from business development to taking increasingly active roles in developing, supporting and extending both the capacity and linkages in innovation systems that are aimed at increasing the rate of regional economic development.
- Support the formation of international linkages to try to increase the speed at which companies can connect with international markets.
- Take an active role in open innovation through building networks that link companies seeking innovative ideas and those that are establishing these ideas.
- Assist governments to commercialise new technologies that are of national importance by embedding a technology specific incubator within an existing broad spectrum incubator.

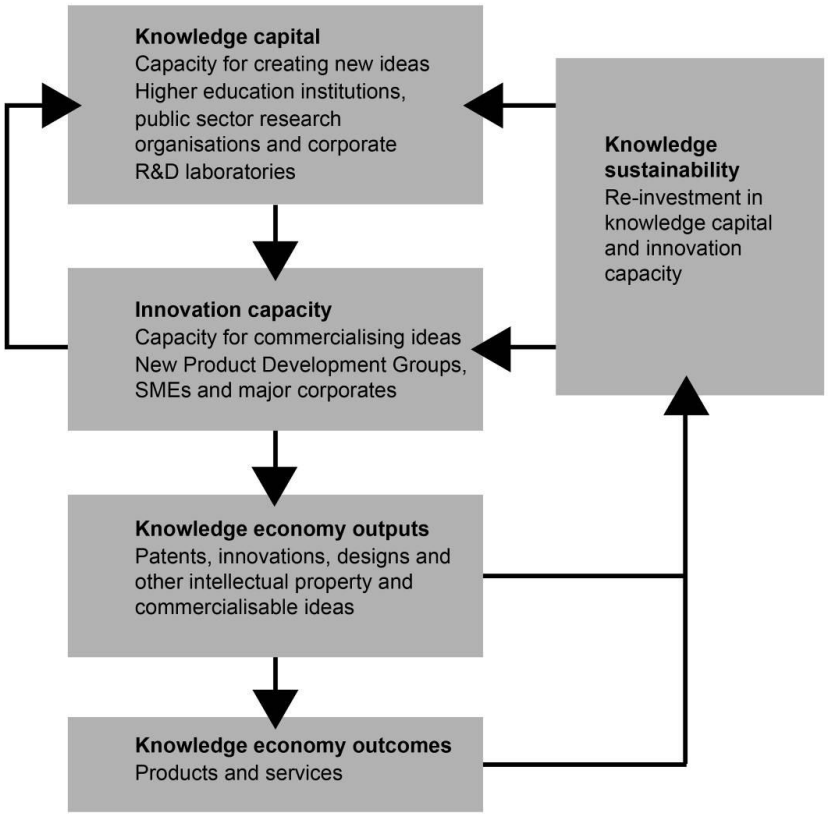
  Examples of this activity include embedding a space technology incubator in the existing non specific technology incubator known as the Surrey Technology Centre which is part of the Surrey Research Park in the UK and the development of a nanotechnology incubator in Sri Lanka.

**Innovation systems**

A study of the performance of companies on science parks undertaken by the UK Science Park Association and the UK Government's then Small Business Service, in 2003[1] noted that science parks that operate in regional environments that provide all the elements and connections noted in Figure 1 are more successful than those where the linkages are either missing or not functioning.

The message here is that managers on science parks need to understand where capacity is missing and find ways of filling these gaps,

**Figure 1 Model of the Sub Regional Economy (after UKSPA 2003 and SEEDA and Huggins 2001[2])**




Knowledge capital includes a wide range of organisations which include universities, public sector research organisations, and private R&D organisations such as corporate research laboratories and

[1] UKSPA 2003 Evaluation of the past and future economic contribution of the UK Science Park Movement. Published by UKSPA in conjunction with the Small Business Service.
[2] SEEDA and Huggins Associates 2001: SEEDA and Robert Huggins Associates 2001 Global Index of Regional Knowledge Economies: Benchmarking South East England.

contract research organisations. Opportunities exist to develop relationship management programmes to link these organisations into partnership agreements with science parks. If these can be associated with technology transfer funding programmes they become even more attractive links.

The utilisation of the ideas that emerge from these generators requires innovation capacity that is capable of developing and commercialising new products. This capacity derives from a number of organisations that include:

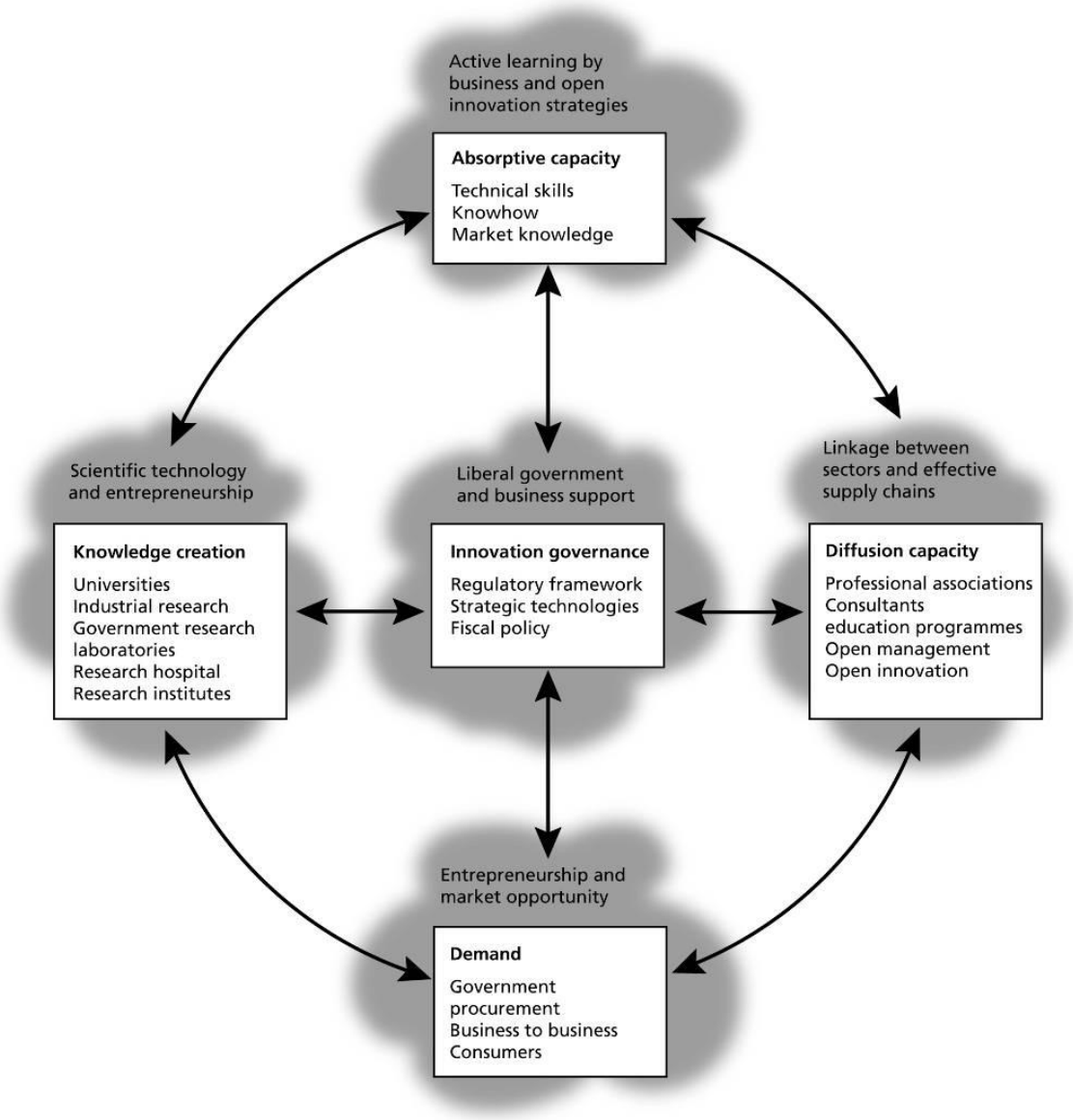
- Small, medium and large enterprises in the region that are driven to improve their competitive position in the market place.
- Groups concerned with new product development such as designers, contract research organisations, consultancies, and business development teams.
- Organisations which understand the creative process of entrepreneurship which helps to wrap ideas in an attractive way that encourages customers or buyers for the outputs.
- Active engagement between customers and suppliers in supply chains to help to drive utilisation of new ideas.

When science parks were first established the networks they created tended not to be supported by any explicit plan; however, the value of these linkages is now recognised and this has prompted the extension of this idea into creating regional innovation systems. These systems use active management, policy frameworks and interventions to try to ensure that the necessary linkages that connect supply and demand are created and each element operates to its full potential. These elements are characterised in figure 2.

This system attempts to create the foundations for building capacity for innovation. This connects knowledge creation, encourages the wider use of skills to absorb ideas for commercialisation, helps diffuse these ideas into a wide target group and helps to create new markets or facilitate access to existing or new markets which is described in figure 2 as demand.

**Figure 2– characterisation of an innovation system- after UNECE description[3]**

[3] United Nations Economic Commission to Europe 2009. Enhancing the innovative performance of firms. Policy options and practical instruments ISBN 978-92-1-116999-7.




In this process the production of new ideas and the qualified human resources that can interpret ideas and technologies and translate them into a business model needs to be in place. Without this capacity to absorb ideas some of the elements in any technology, company, or market journey are more difficult to achieve.

The process then relies on the ability to diffuse the ideas from these generators into the business community and society and that the ideas that are created find markets that are prepared to utilise the outputs.

Experience has shown that science parks and their host organisations can play a central role in these systems. Factors which help to give this lead to science parks include the brand value, the support they receive because of the broad range of stakeholders which they attract, the presence of on site management that provides the resource to assist in developing the site as a centre for connecting ideas with people through their access to networks and finally their pre and full incubation activities.

Today with shrinking public sector funding available for general business support government is looking for efficiencies in their spend but still want to realise their value propositions for science parks. This shift in the balance of public expenditure provides science and technology parks with an opportunity to establish and maintain the role of leadership in supporting innovative companies.

To do this the largest parks in a region should try to create connectivity in order to provide a central management support programme for their region. Suggestions to support that include

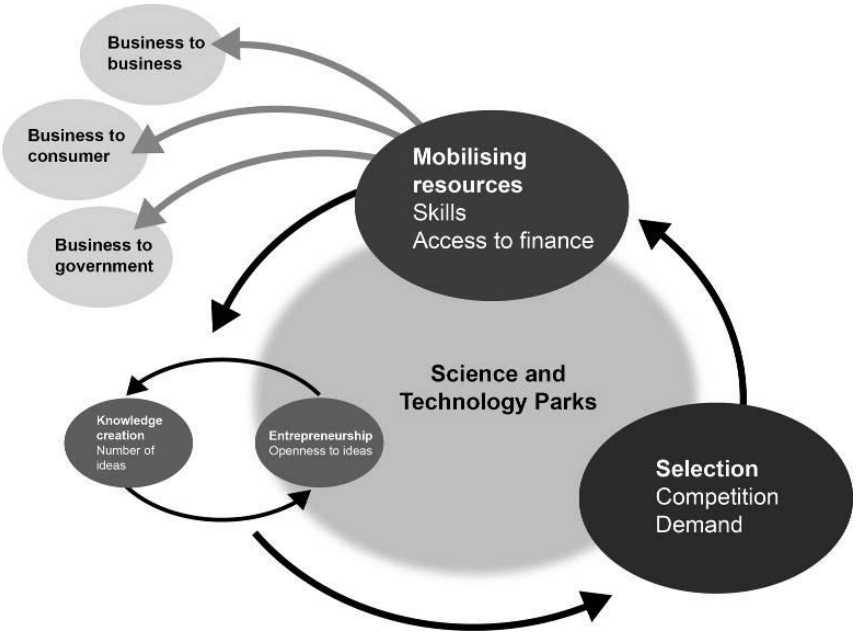
modern video conferencing techniques to link all the parks in a region to provide for example business education and business development programmes.

Innovation governance lies at the heart of innovation systems. This represents the kind of activities which create the right macro-environment that supports business formation and development. Examples of factors which are important in this environment include: creating a good tax environment for investors in companies whether they are active in the management of the company or external investors, making funds available to support the stages of the technology, company and market journeys, establishing a regulatory environment that does not over burden businesses, and creating a regulatory environment which supports enterprise, helps to create markets and does not stifle competition by creating for example state run monopolies or prevent enterprise.

**Functional links on science parks concerned with capacity building and supporting innovation**

A macro view of the process that is supported by science and technology parks is characterised in figure 3.

**Figure 3 – characterisation of the role science and technology parks play in innovation systems.**




The elements, activities and linkages characterised in this figure pull science parks away from discovery activities in knowledge generators. The bulk of the work by science and technology parks is to support entrepreneurs take their ideas through a selection process that scrubs out those ideas deemed to have low potential and leaves those with some perceived value in place for further development but that requires skills and finance to be mobilised. The stage beyond that is to build businesses that address potential markets or if the idea or skills do not make it, the skills developed in the process should be recycled back into the business community.

Underlying these functional links are a series of technology, market and company journeys[4] which if successfully executed lead to an increase in the number, size and efficiency of companies in a region.

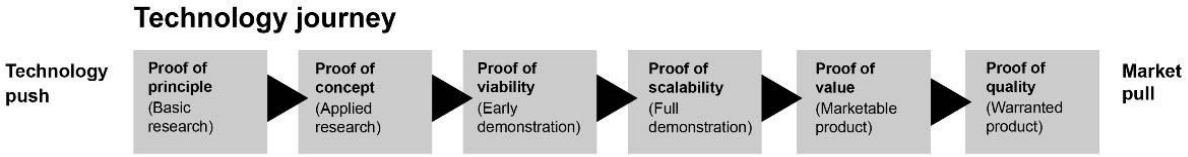
***Technology journey***

The technology journey that underpins these links is outside the remit of science parks but becomes interesting when entrepreneurs begin to appreciate the value of these new ideas in satisfying a real or perceived customer requirement. This may result from a response by an entrepreneur to a technical specification which pushes technology towards a market or appreciation of a market by an entrepreneur for a technical specification which helps to pull this towards the market.

This technology journey can be characterised in the following way (figure 4).

[4] After R.Trezona 2008. Presentation to the The R&D Society, UK

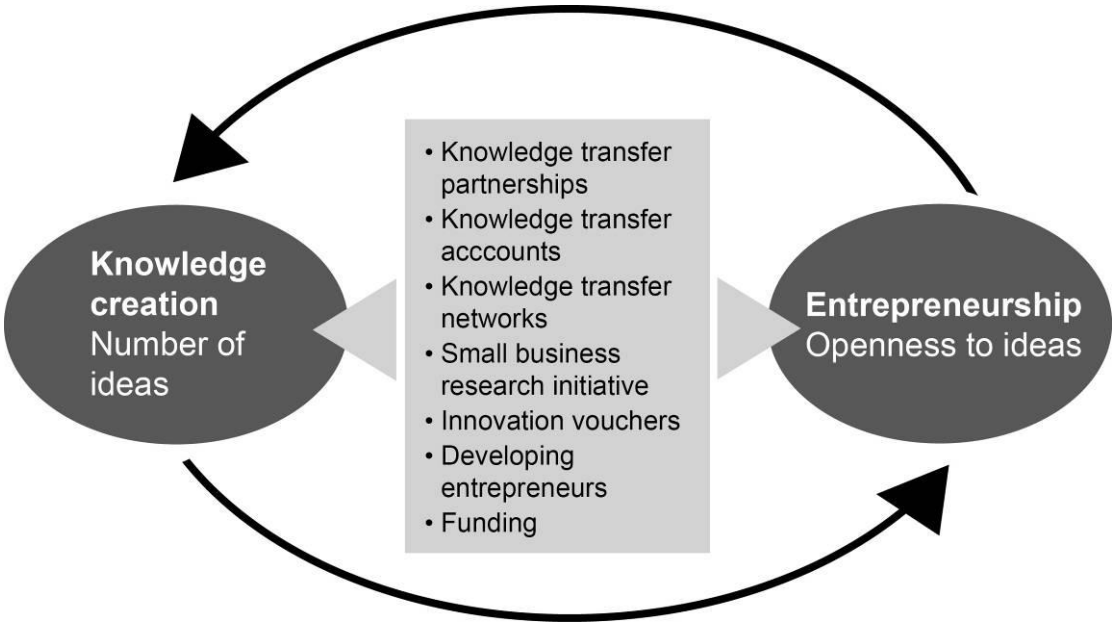
**Figure 4 – characterization of technology journey in business development**




Although some ideas emerge from the business environment through people that are active in a sector, most of the ideas in this process emerge in the first instance from knowledge generators such as universities, government research laboratories, and research hospitals.

Experience suggests that for these ideas to be effective in creating commercial activity there needs to be in place a range of technology transfer programmes. A number of examples of these are described in figure 5.

**Figure 5 – characterisation of technology transfer programmes for linking knowledge generators to the commercial sector.**




Examples of policies and policy instruments in the UK which support the connection of technology to the market include:

*Knowledge Transfer Partnerships*

These are aimed at helping businesses improve their competitiveness and productivity by using knowledge, technology and skills in the UK knowledge base.

The benefits for academics that are engaged in these programmes include keeping them up to date with commercial needs; helping academics work on real business problems and helping them find new research themes for undergraduate and postgraduate projects. In this relationship business gains access to skills and expertise for business development.

The kind of projects these support include product design and development, developing manufacturing practices and management processes or working on computing or management information in order to solve problems through innovation.

*Knowledge transfer accounts*

These are funded by the UK government with the view to supporting specific skills from a particular university's expertise. Examples of these include accounts in nanotechnology, photonics, communication and signal processing and next generation materials and characterization. The purpose of these is to help match outputs and capabilities from universities with industrial needs,

provide access to funds for pilot and demonstrator programmes, and increase the speed and reduce the costs for access by business to university facilities in order to support innovation.

This programme is also available to support spin out companies that may have been created within the university. They have particular value in supporting demonstrator programme that are concerned with bringing technology closer to the market.

*Knowledge Transfer Networks (KTNs)*

In the UK there are currently (2011) 16 KTNs which operate in specific fields by linking people who are concerned with driving a specific technology across industrial sectors and encouraging commercially based solutions to be founded by companies.

*Small Business Research Initiative (SBRI)*

This programme supports the need for the UK governments, like most governments in the world, to reduce the cost to the public purse of R&D. It has been organised to help early stage, high-technology Small and Medium Enterprises (SMEs) gain greater access to Research and Development (R&D) opportunities while supporting the future procurement needs of Government Departments by offering competitive R&D contracts that aim to:

- Provide opportunities to those existing small firms whose businesses are based upon providing R&D - by increasing the size of the market;
- Encourage other smaller businesses to increase their R&D capabilities and capacity - to exploit the new market opportunities;
- Create opportunities for starting new technology-based or knowledge-based businesses.

Part of the thinking behind the SBRI is that it enables government departments and other UK public sector organisations to procure new technologies faster and with managed risk through a phased development programme, and it provides paid contracts for the critical stage of product development.

*Innovation Vouchers*

These are a mechanism aimed at small and medium-sized businesses which can use the vouchers to buy support from an academic institution to explore potential opportunities for future collaboration.

*New frontiers*

Ideas which need to be developed include:

- International connections for ideas – building international technology networks that focus on a single sector to try to increase the intensity of commercialisation of ideas by cross licensing arrangement and broadening the exposure of the ideas to the early stage equity market.
- Building networks that connect corporate venturing activities to pre and full incubation programmes.
- Helping governments deliver funding programmes to high growth companies that are active in technologies that have a national priority.

*Entrepreneurship*

This presence in a business community of entrepreneurs is a critical ingredient. If there are high numbers of entrepreneurs with a broad range of skills that are able to both identify business models to develop technology for the market and wrap the right skilled workforce around the technology the greater the chance of success.

Ideas that are now being supported by science and technology parks to help encourage entrepreneurship include the formation of a number of entrepreneur clubs at universities which are concerning with building a culture and ethos of entrepreneurship among students. The experience at Surrey is that an “entrepreneur in residence” is now working in the University’s Business School to support the University, its students and the Surrey Research Park.

*Early stage funding*

A model for funding technology transfer that is gaining momentum in the UK is based on a contractual relationship between a host organisation and private equity capital group. Around 10 universities in the UK have signed such an exclusive arrangement with the IP Group. The business model values the IP at a pre-determined value, the IP Group take an agreed proportion of this and then work with the IP to develop its commercial potential.

A similar programmes associated with government research laboratories has been established through a privately managed evergreen fund (Rainbow Fund) that provides support to ideas which have commercial potential.

*Technology transfer offices*

Today there is increasing emphasis on funding R&D that has a strong orientation towards potential commercial value. This direction when associated with the cultural change engendered by the presence of a science and technology park on a campus helps to increase interest in the commercialisation of new ideas.

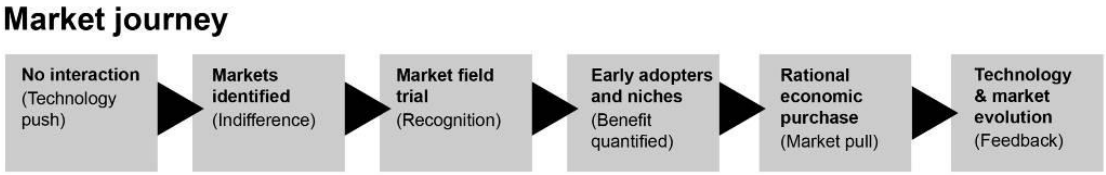
Although there are still relatively few companies being spun out of universities the professionalisation of the work of Technology Transfer Offices in the higher education sector through training and provision of funding to support technology commercialisation means it is likely that this will eventually lead to this occurring on a larger scale

The role of science parks in this technology journey is aimed more towards supporting the downstream commercialisation phases rather than in the discovery process. This means that parks have to be more active in mobilising the resources to drive the market and company journeys rather than technology journeys, although this cannot be ignored.

***Market journey***

A full market journey for technology takes the market from complete indifference to widespread adoption. Of course not all technologies start at the beginning of this continuum and not all end in wide spread adoption. Experience has shown that some are taken out of the market by acquisition before they are become fully fledged technologies.

**Figure 6 – characterisation of the market journey in business development**




The critical ingredient in this journey is the skills and flair of the entrepreneur. This comes from a combination of an understanding of the market place, recognising how this market would benefit from the technology and then organising the development of the market.

However, there are support programmes which can help with working along the process. These include:

- Providing funds to create demonstrators for field trials of ideas.
- Using networks to link companies still in incubation with larger companies looking to develop by using open innovation strategies.
- Using science park networks to connect companies across wider sector groups.
- Taking an active role in promoting and supporting companies as they link into Knowledge Transfer Networks or their equivalent.
- Creating connections that bring into the network international equity finance that helps to widen the exposure of the ideas with commercial potential to an international market.
- Using their connections to promote companies through international trade support channels such as trade missions, commercial attachés, and other science parks with which they have contact.

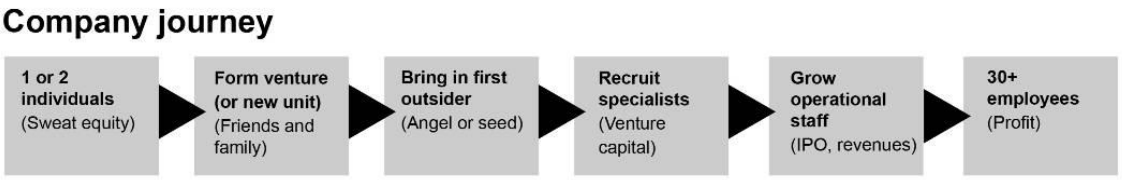
- Connecting companies and government services that help to provide market intelligence. In the UK a number of programmes are available that can be used to provide this information.

*Company journey*

One of the most common patterns for a company journeys is characterised in figure 7. This usually starts with 1 or 2 individuals and numbers of employees are added as new dimensions to the business need to be explored and developed. In the case of spinout companies these individuals are often technology entrepreneurs. As the company develops the team needs to be supplemented with a wider range of skills. Most commonly the initial increase in skills comes from the investors.

Recruitment of the right people on which to base a team is one of the most critical aspects of building companies. Although this does have element of chance it is possible to reduce the risks by using the networks created by science parks to help to identify potential employees.

**Figure 7 – characterisation of the company journey in business development**




In terms of the value of high growth coaching this has particular value when staff levels have reached more than ten in number. Some examples of the kinds of programmes that have been put together in high growth coaching include:

- Finance for Growth – this provides advice on the basics that every business leader should know in managing a growing business effectively and includes details on raising finance.
- Market intelligence - how to increase or better organise company awareness of current and potential markets by developing a marketing intelligence strategy.
- eMarketing and eCommerce - to facilitate the widest possible use of the tools and techniques made available by the e-revolution to open up new sales and marketing opportunities.
- Out-thinking the competition - advanced creative techniques to give companies the edge through enhanced decision-making and improved leadership capabilities.
- Building the innovative organisation - to demonstrate how fundamental improvements in organisational behaviour can embed innovation in all aspects of a successful business activities and how to protect the results.
- Improving selling skills - to help improve understanding of the sales process and the development of personal selling skills across senior management
- Leading and managing high growth - training for senior managers who have had little previous formal training and lack the leadership and management expertise to sustain growth
- Change management - implementing change at middle management level is a major concern in growing companies. This proven change management training helps middle managers deal effectively with change
- Management information healthcheck - an audit of a company's current management information, followed by a written report on the potential management information needs of the business as it grows.

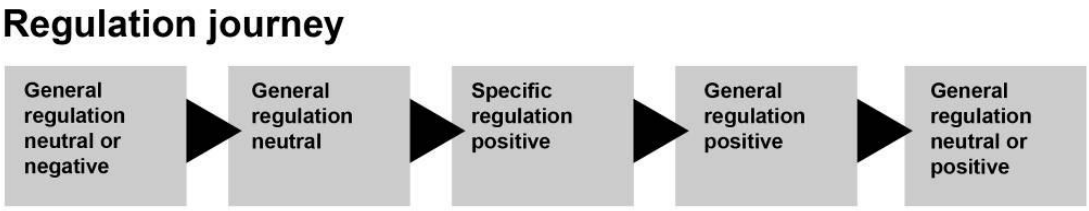
Providing these programmes through third party contractors that work across regions can help to keep cost low while helping to up-rate a region's innovation capacity.

*Regulatory journey*

Many new ideas have emerged following the liberalisation of markets and de-regulation. In addition and conversely a number of new markets have emerged as there is increasing control over some aspects of human endeavour such as development and the need for increased control over the environmental effect of these endeavours.

Many new companies need to be cognisant of the opportunities these changes in the legislative framework can provide or limit.

**Figure 8 – characterisation of the regulation journey associated with business development**




Examples of deregulation that has driven entrepreneurship include changes in the telecoms sector and in some areas of bio-technology such as allowing stem cell research while in contrast the need to test the environmental impact of development has created an industry that now has to employ ecologists to do the work.

Most regulations are promulgated by governments. Today details of the these regulations can be found on such sites as Netregs for the UK regulations on the environment and other business support sites such as Business Links.

One of the roles of science parks is to know how to guide companies in interpreting these regulations.

*Pre and full and post incubation (technology acceleration) and developing companies*

The process of pre, full and post incubation is an area in which science and technology parks are continuing to evolve and develop new ideas.

Some examples for opportunities for pushing the boundary for science and technology parks include:

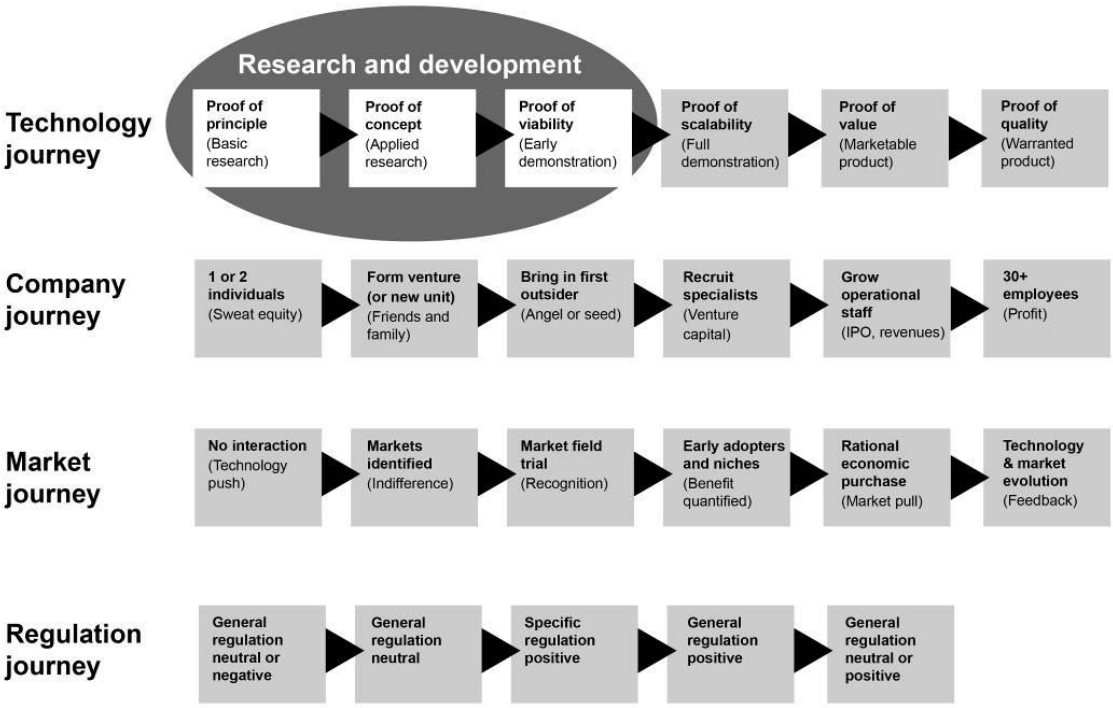
- Professionalising this process.
- Concentrating resources in one location and then operating across a network using the professional skills to support the process in a number of locations. There are strategies which can be adopted by science and technology parks in order to create this concentration of activity. These include pricing for accommodation and services, increasing the opportunity to gain access to development finance, provide access to support programmes and the potential to support companies gain access to market related networks.
- Developing specialisms in relation to supporting specific technology sectors.
- Developing working relationships with private sector groups to help develop companies.

To understand better how these kinds of initiatives can be deployed it is of value to review how the processes of pre and full incubation, technology acceleration, investment, growing enterprises and the regulatory frameworks overlay technology, market and company journeys operate.

Although there is no single route through these different parts of the journey for developing companies there are sufficient distinctive elements to enable these to be classified and from that developed to become even more effective.

**Figure 10 – 1 to 6 - characterisation of the early stages of the development of companies supported by science and technology parks**

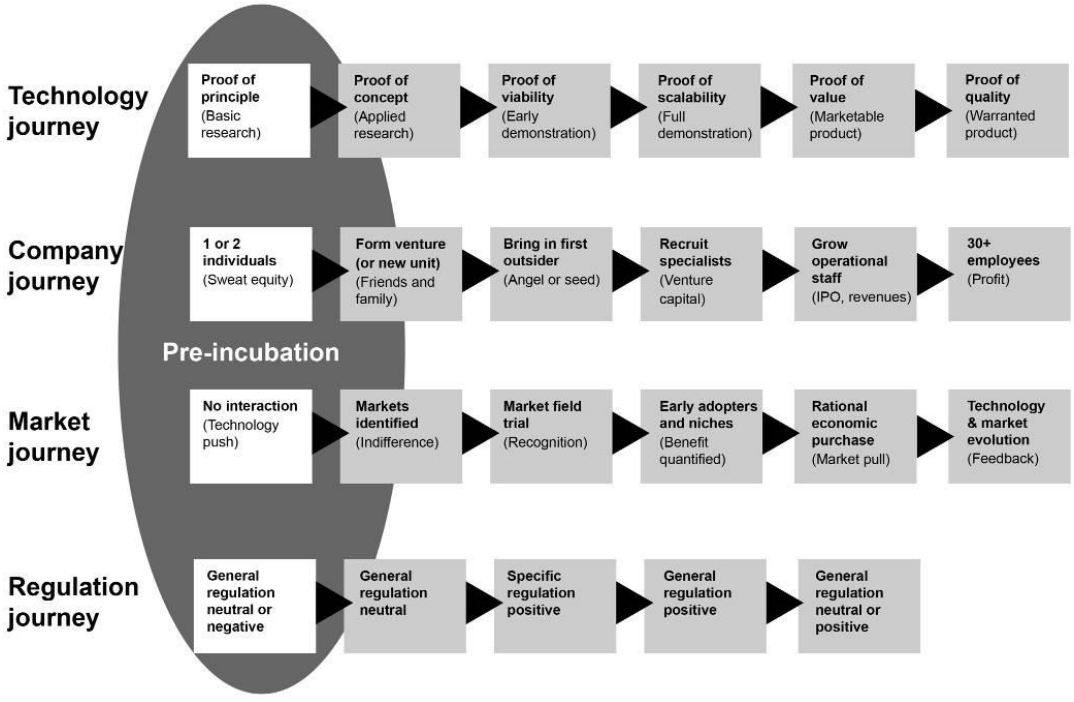
**Figure 10 – 1 research and development**




The science park model adopted in Europe and US does have the capacity to support R&D and some companies on these sites operate corporate development laboratories; however, the majority of the work undertaken on these sites occurs further up the value chain than the discovery stage. However, it is important to have in place the necessary links to help connect ideas to the commercial sector.

In the last 5 years it has become more common for science and technology parks to create and run pre-incubators.

**Figure 10 -2 – pre incubation**



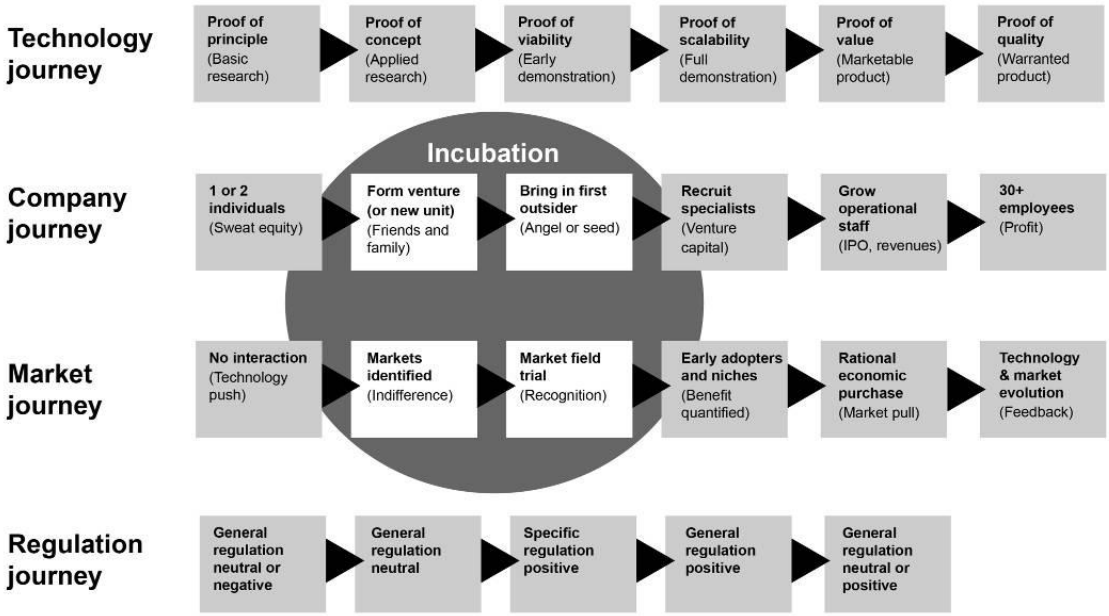
Pre incubation is an activity that has evolved on science parks as a social development that is aimed at reducing the risk to entrepreneurs as they try to find ways of commercialising the output from research and development.

This allows entrepreneurs to have low cost accommodation and free business support to help them with the investigating and defining how they intend to develop their company and embedding this story in a fundable business plan that would normally sets out an executive summary, a short description of the business opportunity being pursued, a marketing and sales strategy, the proposed management team, the operational aspects of the business, and the finances of the business.

This process is designed to support entrepreneurs as they work across on developing the foundations to the technology, company, and market journeys for their ideas. In most instances the process is subsidised, but time limited, and company development is measured against milestones which are agreed with the support teams for these social projects.

Once a credible business plan is in place the next and critical stage is to raise finance for the incubation process. In some countries this investment is made available through government financing programmes where as others do not have this benefit and have to look to the private sector to raise finance. In this the process mainly focuses on creating the right team to develop the company and on the early stage of convincing the market that the idea is credible.

**Figure 10 – 3 incubation**




If these stages are negotiated successfully the project can then be accelerated by paying particular attention to the development of the market and then on further building the team as the company moves to provide warrantable products that begin to secure market share.

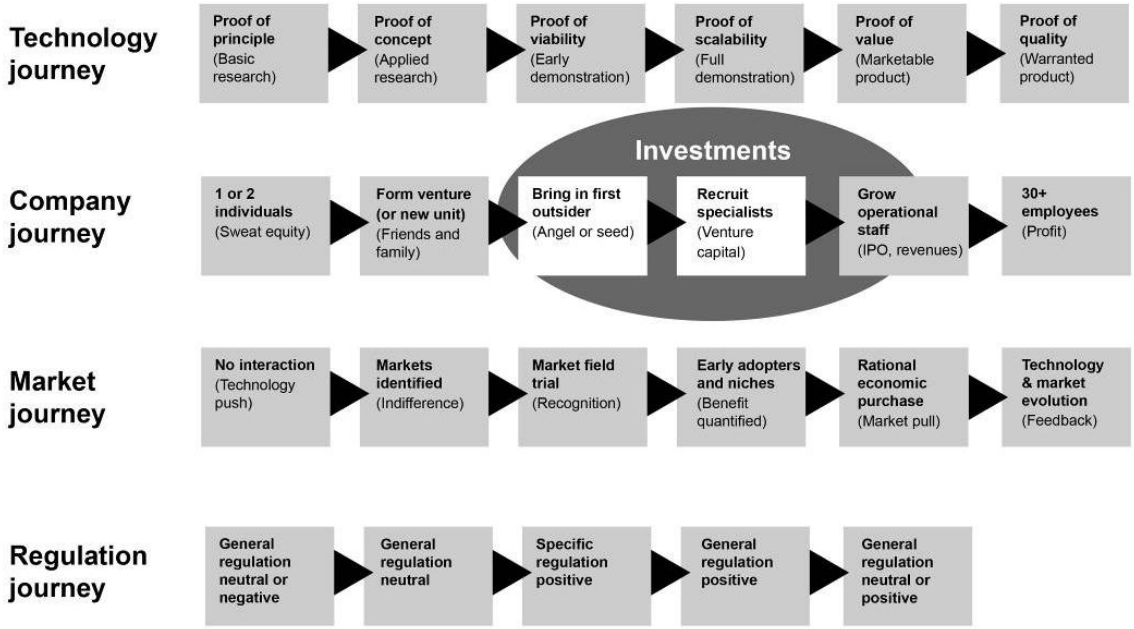
Particular new developments that have been added to the blend of services to support these journeys include:

- Employing an “entrepreneur in residence” in business pre and full incubators.
- Establishing an investment group and trying to increase the capacity and skills base in this by putting in place international links with this group.
- Putting in place pre incubators through outreach programmes in other local institutions which may have individual entrepreneurs or groups of entrepreneurs that are interested in building a business.
- Working with students on entrepreneurship programmes in the host university’s business school.

Once an enterprise has reached the phase of a warrantable product on the market it would be usual to push them into alternative larger but less well serviced accommodation.

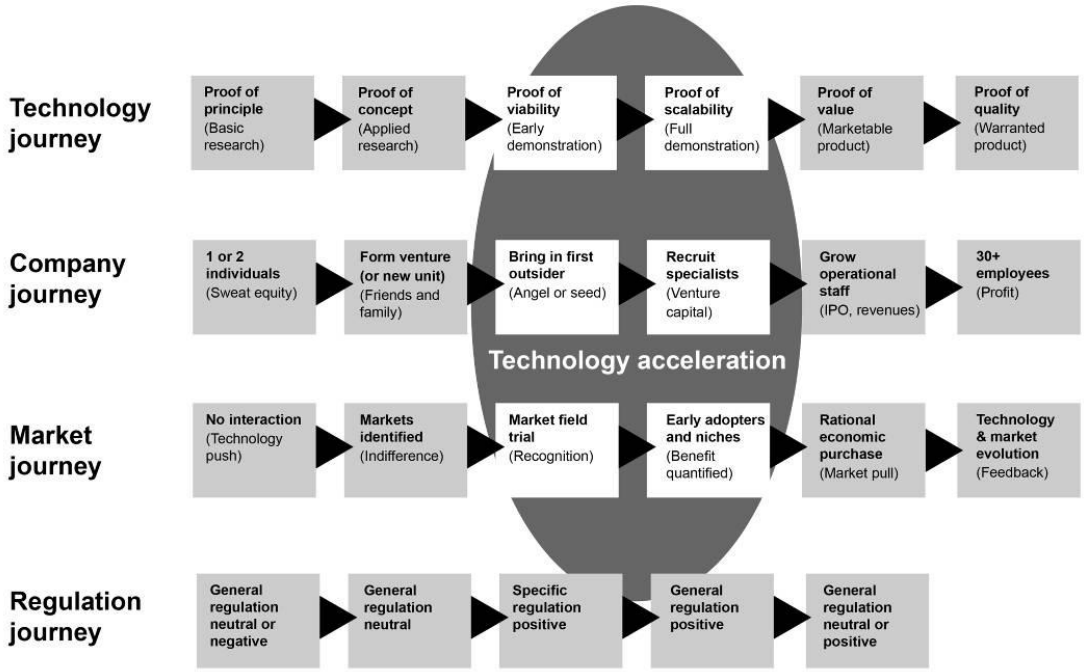
At this stage there is some benefit from keeping these companies on the Park as they provide valuable income, they continue to develop and through this development employ and train people which helps to add to the capacity of the skills base in a region and they can attract valuable foreign direct investment.

**Figure 10- 4 investment**




One of the areas with greatest potential for development relates to raising appropriate finance. The value of appropriate finance is that this by definition implies that those making the investment are well connected to the potential market place for the new business. International connections in this process is important and worthy of further thought and development.

**Figure 10- 5 technology acceleration**



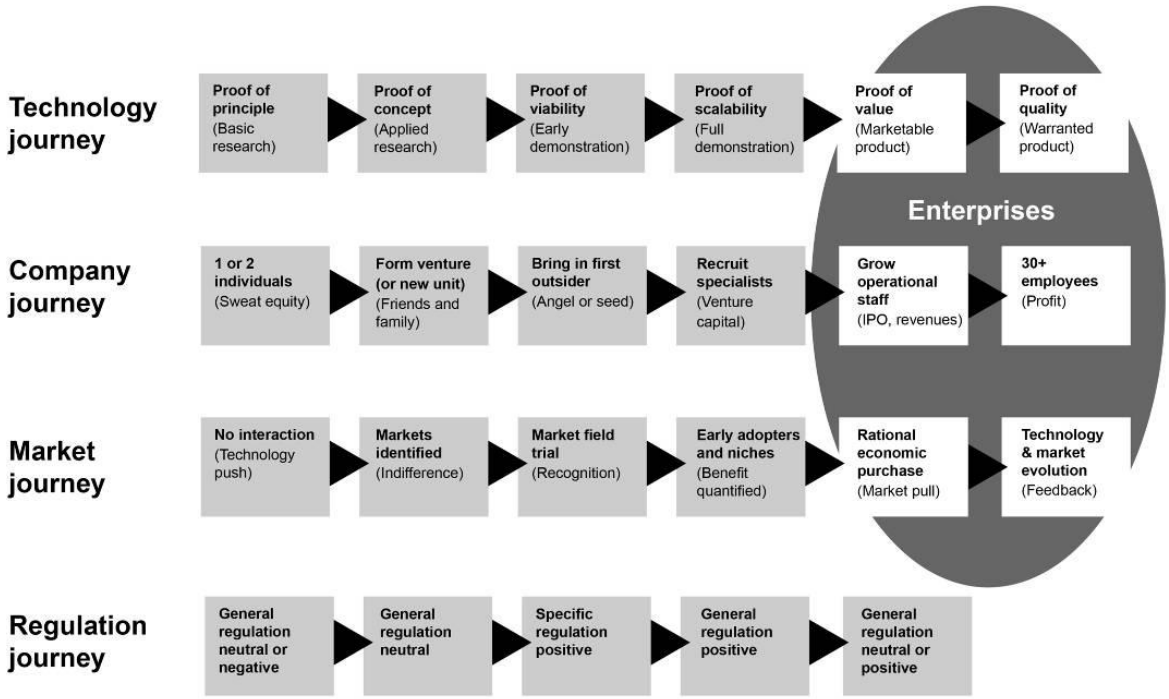
Significant effort has been directed at establishing business incubation programmes which enable companies to take the first steps of taking forward ideas. However, an area of work that has potential for science and technology parks is to develop business acceleration activities.

These are more focussed on enterprises that have begun to penetrate markets, have a compelling business case but need additional investment in their skills base and the finances of the company.

The transition from the incubator to the accelerator often comes with closer engagement in the company by investors as they expect faster results from the process.

One of the features of business acceleration is access to high growth coaching programmes that assist company executives create internal environments to support growth.

**Figure 10- 6 Enterprise established**




One of the important features of science parks is the ability to support companies above and beyond incubation by providing the space and resources to support them as they grow. To achieve this there is a greater emphasis on the quality and flexibly of business accommodation, a need to good access to skills, technology to support a customer base.

This capacity to accommodate growth is an important role for science parks as they help companies to emerge from their early technology, market and company journeys.

*Assessing the development of companies*

There is now a range of business planning strategies that can be applied to the assessment of the business incubation process. One of the new frontiers for science parks is to adopt and adapt these kinds of programmes to support their businesses.

To do this requires increased professionalism by park management.

One of these programmes is the Bell Mason Diagnostic[5]. This system is a rule-based tool that is applied manually to characterise and plot the status of a technology venture at each stage of its growth. The analysis is based on measuring performance on twelve dimensions organized in four groups, each containing three dimensions.

[5] Copyright © 2011, The Bell Mason Group, all rights reserved. The Bell Mason Diagnostic is part of the proprietary Bell Mason Portfolio and Venture Development Framework, developed by Gordon Bell and Heidi Mason.

The four groups cover:

- The business plan which includes marketing and sales
- The CEO and in that dimension it covers the team and board of directors
- Cash and that includes fundability, the control of the finances
- The technology or engineering that covers details of the product development and if it is a hard company it covers manufacturing.

The critical part of the process is once a diagnostic tool has been used is how to make good deficiencies of the business plan. The value of this kind of programme is that it provides a framework which can be used to resolve outstanding issues in a business plan that can be used to give comfort to investors.

Framework in these kinds of diagnostic programmes assess what stage on the combined journeys the company has reached and what else needs to be done to develop its capacity to meet the demands of its market place.

Although this is not a linear process the elements which need to be addressed include a number of sub-sets of activity.

Developing the concept and its potential involves committing resources to assess:

- Market feasibility (customer needs and opportunity) that is who, if anyone has a real need for the thing I propose to sell, and how many of those potential customers are there?
- How much, if anything, are they spending to address that need today?
- Does my product meet that need in a manner that either saves or makes them substantial amounts of money?
- Does the business opportunity offer a sustainable advantage which will stand the test of time and other changes in the market?
- Product ideas, alternatives, benefits offered.
- Product/technology innovation (number of hurdles).
- Attractiveness of market for new entrant.
- Product concept uniqueness and competition.
- Alternative business models.
- Early stage CEO.
- Outline business plan (financials and risk analysis).
- Secure funds for seed (and next stage if possible)

Experience suggests that common reasons for failure include:

- Insufficient or inappropriate initial assessment of the market opportunity is a common problem that usually leads to failure.
- Unrealistic self assessment of technology. To help understand this it is important at this stage of the process to study the both the competitive environment and customer needs adequately.

If a realistic product or service emerges from this scrutiny then the next part of the process deals with developing a product specification which can be presented to potential customers and putting the necessary human resources in place by developing the team, putting this into the format of a business plan and obtaining the necessary funds to enable the process.

This involves these activities

- Define customer profiles; needs; uses; environment
- Early prospects; requirements capture
- Technology and component sourcing
- Prove technical feasibility
- Component prototyping
- Full product specification and development plan

- Select routes to market and alliances needed
- Identify team (CEO/CMO, CTO, CFO + Board)
- Full business plan and strategic marketing plan
- IP protection
- Funds for product development

Additional question which need to be understood include:

- When to recruit a comprehensive team. It is understood that there is a correlation between stability of business model and successful recruitment. It is also now well recognised that flexibility among staff is key.
- The opportunity to outsource routine business functions is now achieved with relative ease. Part of the added value of a science park is the network in which it operates which if well developed can assist companies in obtaining the services required to enable companies to find the necessary resources. This then allows entrepreneurs to focus on the key goal of revolutionising a major market and achieve sales rather than focus on routine business activities.
- To build value it is important that ideas are protected and to achieve this it is critical that the firm demonstrates a coherent approach to patenting its IP.

Patents have a number of benefits which include:

- They create a 20-year 'window of business opportunity'.
- They add value to a company on exit if this happens before revenue generation
- In industries such as life sciences where R&D-to-sales ratios climb as high as 15 per cent protection against free-loaders is especially important.

It is important that the benefits of a product or service are shown to be viable to the market. This requires testing the product or service by developing prototypes which needs to be followed by trial prototypes operating in real environments demonstrating to customers that it provides significant advantages to customers which includes cost, convenience and reliability and gives the customer themselves a competitive advantage and provides the necessary customer satisfaction.

This involves:

- Plan development and recruit as required
- Detailed design and specification
- Create test prototype; in-house test
- Marketing leads for customer trials
- Build pre-production/user prototype
- Customer/field trial (including all business operations: sales, production, delivery, support, invoicing)
- Manufacturing and distribution alliances in place
- Sales people/channel alliances in place
- Essential business control/systems in place
- Full marketing plan and updated business plan
- Finance (further rounds)
- Team/culture building

If this process proves to be a success the next stages involve launching the product, working in a competitive market and customer expansion; managing growth; hiring and training the right people and working on funding expansion and developing a cash flow to support the company.

This involves:

- Putting marketing plan and associated sales tools into action.
- Launching the product/service to a wider market than those in the test market.
- Ensure the operational quality of the production or service.
- Ensuring there are the necessary resources to support expansion.
- Monitoring competitors and continuing ensure the product and service is competitive.

- Continuous improvement of the existing product or service and starting on a new product development cycles.
- Recruitment of the appropriate personnel to support the growth of the company.
- Working to meet business plan targets including profit targets.
- Ensuring financial control is in place to secure cash flow and liquidity during growth.
- Building systems to support growth.
- Team motivation, reward and training.

The next stage of development of a company will vary between those where there is an ambition to grow a company and those planning an early exit. However, disregarding these varying approaches further important elements of development include continuing with product evolution, supporting customer service and looking to improve efficiency with the intention to secure sustainable profitability and long term growth.

The activities that need attention to help to secure this include the following:

- Looking at future trends and options for the future
- Innovation and developing new products
- Maintaining and building required competencies
- Implementing competitive strategy
- Improving business systems and efficiency
- Extracting profit and returns

Experience has shown that shortcomings of tenant companies that fail to develop include:

- Over estimating the value of the technology.
- Failure to create any interest in the market which means they fail on the market journey.
- They fail to gains sufficient momentum in the market to secure a large customer base and delay too long in trying to find a partner that can help them cross the "chasm" between winning some customers and really making good progress by winning any significant market share.

To try to overcome this difficulty there is value in creating a networking organisation that can be used to promote these companies and try to create the right connections to large companies to help them win market share.

**Valued added services to support this process that represent new frontiers for science and technology parks**

Managing the connections into regions from science parks to link companies has proved to be a valuable activity. The Surrey Research Park has actively pursued a regional role by establishing an innovation and growth team. The team has been given the responsibility of is has taken a target of connecting a range of companies of different sizes to support innovation.

The area includes the Surrey Research Park, three research universities, a presence of 250 large corporates, and eight local authorities.

This team has worked to meet the vision of building a high energy community of innovation across the region.

The purpose of the team was:

- To create an access to expertise and opportunities for collaboration to accelerate business growth.
- To significantly raise the levels of business to business collaboration and connections to the university knowledge base.
- To assist companies leverage finance.

To date the team has connected and working with:

- 500 companies have joined the IGT 'Community of Innovation', of which 170 receive intensive support which include enabling them to achieve circa 20% growth on average per annum.

- 20 big businesses which are active in the Community of Innovation by working with entrepreneurs, University partners and SME businesses in the network to bring new ideas and products to market.
- 40 clients across the region with a funding requirement of £80m. The IGT has taken an active role in helping these clients to identify appropriate sources of funding and then helping them to develop the correct proposition to secure funding.

The work of the IGT is consistent with the engagement of science parks in building regional capacity.

**Conclusion**

Although not perfect instruments for facilitating economic development associated with the commercialisation of science and technology these developments have been instrumental in helping to shape the business environment to support the process.

They have pioneered and led on pre and full business incubation and they have a proven track record in developing and sustaining innovation systems.

This has led to increasing interest in what these sites do that helps the process of creating companies and what can be added to their contribution.

A number of new frontiers are now becoming increasingly apparent. Some of these build on existing services and professionalise these while others have the potential to extend linkages to wider networks to promote new ideas.

All of these ideas require some public investment but it is clear that these funds are less easily found with growing demands on the public purse so one of the major opportunities is to build links with the private sector to help create funding streams for companies. However, it is unlikely that the private sector will fund business development in its widest sense which means a new frontier for science and technology parks is to work in consortia to reduce costs by sharing overheads.