

***Report on  
Science and Innovation Centres***

**Developed for:**

**The Northern Labour Market  
Information Clearinghouse**

**Prepared by:**

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## **A. Introduction**

This Northern Labour Market Information Clearinghouse Report examines the purpose and function of science and innovation centres, particularly as they relate to, or as part of, post secondary educational institutions. This report describes the results of a literature search that is provided in Appendix A. It examines how a science and innovation centre fits with universities and with colleges. Finally, it discusses which aspects of such centres are best suited to colleges and offers recommendations.

## **B. Definition and Background on Science and Innovation Centres**

“Science park” is the generic term for a variety of similar initiatives that go by a variety of terms, including: “science and innovation centres”, “research park”, “science park”, “technology park”, “technology incubator”, “innovation centre”, and “technopark”. For the purposes of this paper, the term science and innovation centre will be used in place of the generic term science park.

A science and innovation centre is essentially “a cluster of knowledge-based businesses, where support and advice are supplied to assist in the growth of the companies. In most instances, science and innovation centres are associated with a centre of technology such as a university or research institute.” (*UK Science Park Association*)

Typical functions of science and innovation centres include:

- Encourage and support the start up, incubation and further growth of innovative businesses with good growth potential;
- Provide an environment where larger, frequently international businesses can develop specific and close interactions with a particular centre of technology for their mutual benefit; and,
- Create a formal and operational link with such a reservoir of technology. (*UK Science Park Association*).

Services provided by science and innovation centres can include:

- Property available at for lease at reasonable rates;
- Technology support by the associated university or research organization; and,
- Business services, including reception, telecommunications, photocopying, cleaning, security, secretarial support, and use of conference rooms.

A frequently related aspect of science and innovation centres is the “business incubator”. The business incubator provides intensive, hands-on support and services to assist specifically in the creation and early-stage growth of businesses. Services provided can include: help with business planning, raising finances, marketing support and mentoring. Enterprises selected to benefit from this support are usually encouraged to leave the incubator after about two years when they have acquired a strong skills base and management experience. In 2000, 83% of science parks surveyed had an incubator while 17% did not. (*IASP News*, September 2000)

Keeping in mind these descriptions what science and innovation centres are, it is important to note what science and innovation centres are not. The following are not considered to be science and innovation centres according to the previous definitions and examples cited:

- High-tech centres or corridors, such as Silicon Valley in California;
  - Industrial parks, in which manufacturing is the primary focus;
  - Pure property development such as a business park; or
  - Office parks where administration or sales are the main functions.
- (*Technology in the Garden: Research Parks and Economic Development*, pg.5)

## **C. Relevant Literature on Science and Innovation Centres**

A literature search was undertaken on science and innovation centres and related terms. The term “science and innovation centres” did not yield any sources nor was there any literature identified on the topic “colleges and science and innovation centres”. The generic terms “science park” or “research park” did result in the identification of some sources.

There were few Canadian sources on science parks or research parks. Only two Canadian articles were identified in the literature search:

- “Discovery Parks Leader in R&D”. *Journal of Commerce*. February 4, 2002. This article profiles Discovery Parks Inc., a B.C. research park privately-incorporated in 1979 that today has 41 companies and employs 3,500 scientists.
- “Hopes High for Victoria Tech Park”. *The Globe and Mail*, April 23, 2002. This news article describes the newly-opened Vancouver Island Technology Park, which will support the region’s fledgling technology sector, create co-op learning opportunities for students, and result in other economic benefits over time.

Much of the international literature on science parks was written between the mid-1980s to the early 1990s. The more relevant sources identified included:

- Michael I. Luger and Harvey A. Goldstein. *Technology in the Garden: Research Parks and Economic Development*. 1991.  
This was likely the most useful identified source on research parks. It discusses the value of research parks to universities, presents several detailed case studies on successful American research parks, and describes the factors that have contributed to the success and failure of research parks. However, the case studies described in this source are strictly American and date from the 1980s.
- Peter Hamilton. “Science Parks: Growth of Science Parks Since 1981 Has Been Huge”. *Investors Chronicle*. May 19, 1995.  
This British article describes the growth of science parks and identifies different models operating in the United Kingdom.

See Appendix A for the full results of the literature review. Some of the sources cited in the literature search could not be obtained locally.

## **D. Examples of Alberta-Based Science and Innovation Centres**

There is no single transferable science and innovation centre model. Instead, science and innovation centres can incorporate a wide range of different initiatives. The characteristics of each centre are usually determined by its objectives, its location, the prevailing economic climate and the local expertise and resources available.

To demonstrate the range of science and innovation models found within Alberta, a brief description has been prepared on the Olds College for Innovation, Edmonton Research Park, and the University of Calgary Research Park.

### **1. The Edmonton Research Park**

The Edmonton Research Park was established in 1980 to help diversify the Edmonton economy through the development of advanced technology companies. The Edmonton Research Park is situated on a 320-acre site some 15 minutes from the International Airport. It currently has over 35 companies employing more than 1,200 employees.

The major areas of activity at the Edmonton Research Park include: medical, biotechnology, electronics, telecommunications, software development, petroleum research and cold weather engineering.

The University of Alberta, NAIT, and the Alberta Research Council have established formal working relationships with each other in advancing research and technology development at the Edmonton Research Park.

Specialized facilities in the Edmonton Research Park include:

- A 37,000 litre fermentation scale-up pilot plant available for contract research;
- The Advanced Technology Centre (ATC) business incubator offering office space, amenity services, and business assistance to qualified entrepreneurs and startup companies;
- Research Centre One, a multi-tenant facility available to firms on the threshold of growth requiring more specialized working environments, including laboratories and manufacturing related facilities;
- A 28,000 volume technical library; and,
- A 197 seat lecture theatre *(Edmonton Research Park)*

**2. The Olds College Centre for Innovation.** The Centre's Mission is "as a hub to its network partners, assists agriculture, forestry and oil/gas industries through applied research, development and commercialization (new products, technologies and incubation of businesses) and learning opportunities."

The Centre concentrates on assisting small and medium-sized businesses with applied research in composting and applied microbiology, new products from crops and processing, waste management, and complementary production system innovations.

The Dr. Robert Turner Research Centre consists of 8,000 square feet of space for offices, new labs, and expansion room. Together with the Business Resource Centre, it offers the following services:

- Consulting with the research and business staff;
- Accessing federal, provincial, and other library business and product information;
- Accessing seconded staff of Olds College or other scientific partners;
- Gaining access to other scientific labs in Alberta; and,
- Obtaining short-term rental of incubator space.

The Centre works through established partnerships and alliances with a wide variety of organizations. Some of these include:

- The University of Alberta
- Texas A & M University
- Alberta Agriculture, Food and Rural Development
- Alberta Research Council
- AVAC Ltd.
- Finning Corp
- Alberta Technology Commercialization Network

- Town of Olds
- MountainView County (*Olds College Centre for Innovation*)

### 3. The University of Calgary Research Park

Established in 1966, the University of Calgary Research Park is Canada's oldest university related research park. Located contiguous to the University of Calgary, the park occupies 1,200,000 square feet of developed research facilities and houses more than 30 companies.

The University of Calgary works collaboratively with the tenants of the Park to facilitate research and assist the transfer of technology to the mutual benefit of the University and Park tenants.

Tenants of the University of Calgary Research Park are involved primarily in research activity in the social sciences, physical sciences, biological sciences or engineering. This research activity may include pure research, applied research, testing/analysis of materials and equipment, laboratory experiments, process development, production or assembly of prototype products, economic evaluation and business research.

Designated incubator facilities may be available for smaller firms to undertake limited assembly operations. (*University of Calgary Research Park*)

## E. Relationship of Science and Innovation Centres to Universities

In most instances, science and innovation centres are associated with a centre of technology such as a university or research institute. (*UK Science Park Association*) However, a university connection is not essential. The 115 acre Belasis Hall Technology Park in Cleveland Ohio, numbering approximately 80 tenants in 1995, grew out of a former company's research and development facility on the site ("Science Parks: Growth of Science Parks Since 1981 Has Been Huge". *Investors Chronicle*) It is interesting to note, however, that centres which fail are more likely than successful parks to not be connected with a nearby research university. (*Technology in the Garden: Research Parks and Economic Development*, pg.184)

A survey undertaken by the International Association of Science Parks in September 2000 determined that on a worldwide basis, 32% of science and innovation centres were located inside a university campus and 68% were not. (*IASP News*. September 2000)

To date, universities have been the almost exclusive educational partners in science and innovation centres. According to Dr. Alec Bialski, Director Innovation and Technology Development at SAIT, this is because policy makers assume that innovation is directly linked to research and development expenditures, specifically basic research. Currently, well over \$1 billion is invested annually in R&D by the

federal and provincial governments in universities mainly for basic research.  
(*Canada's Technical Colleges: An Untapped Innovation Resource*, pg. 7)

According to Luger and Goldstein, there are seven major reasons why universities seek to be affiliated with science and innovation centres:

1. To help attract and retain entrepreneurial faculty.
2. To help attract good graduate students.
3. To increase collaborative research with private industry.
4. To facilitate technology transfer and the commercialization of faculty inventions.
5. To enhance the general quality and stature of the university.
6. To contribute to the economic development of the region.
7. To generate revenue through land sales and leases (for university-owned parks) (*Technology in the Garden: Research Parks and Economic Development*, pg. 171-172)

Despite the potential benefits realized by universities in such an affiliation, Luger and Goldstein suggest that science and innovation centres may not be the “highest and best use” for university land or the most productive use of university resources. However, they advise that:

Universities that seek to maximize the net benefits from their affiliation with a research park should attempt to externalize as much of the cost of operating the park as possible. For instance, parks that are owned and operated by private corporations, nonprofit foundations, and state and local governments, but that are proximate to the university, would still allow universities to achieve all except the last two objectives (reasons universities seek to be affiliated with research parks) listed above yet with far less financial obligation and risk.  
(*Technology in the Garden: Research Parks and Economic Development*, pg. 171 - 173)

## **F. Applicability of Science and Innovation Centres to Colleges**

In Alberta and across Canada, the Olds College Centre for Innovation is a rare example of a college-based science and innovation centre. According to Rick Tofani, CEO of the Olds College Centre for Innovation, a science and innovation centre is actually a “better fit” with colleges than universities. He contends that colleges have a more intimate connection with industry because they train the future workforce. According to Bob Wilkes, Director Technology Management, Research and Technology Commercialization, Alberta Science and Innovation, “The colleges are perfect entry for industry. It is where industry goes first.” Dr. Alec Bialsky, Director of Innovation and Technology Development at SAIT, maintains that universities tend to focus on creating original knowledge. This focus, says Bialski, “leads universities to seek technology solutions through new science and new knowledge rather than respond to technology problems.”



Rick Tofani also notes that industry tends to build up around colleges, rather than universities. Industry representatives then tend to come to the college with “problems that they want fixed.” Thus it is the colleges’ focus on applied research that industries and business are seeking in order to help solve their practical problems.

According to Bialski, “Colleges are a rich source of knowledge and skill sets. Applied research provides a means to utilize this capital of knowledge and share it with the community. It also allows faculty and students to become involved in innovative applications within the context of real world problem solving.” (*Canada’s Technical Colleges: An Untapped Innovation Resource*, pg. 5)

Both Tofani and Bialski raise practical issues on how science and innovation centres fit with colleges. According to Tofani, Olds College Centre for Innovation has approached the Board of Olds College about the possibility of developing an incubator park. The Olds College Board is seriously questioning whether such a development fits with the mandate and mission of the college.

Bialski argues that the greatest challenge and barrier to creating and maintaining an innovative environment (which can also include the development of science and innovation centres) is faculty members’ workload. “To work on an applied R&D, a faculty member must increase his/her workload or be replaced in the classroom. Both options are neither easy nor popular with college structure, as they tend to be disruptive to the education system. Plus there are no visible incentives to do so.” (*Canada’s Technical Colleges: An Untapped Innovation Resource*, pg. 5)

Other issues facing science and innovation centres is the considerable time involved to seek out and obtain capital and operational funding for such ventures. Operational funding is in particularly short supply, as government and private funders prefer to fund “bricks and mortar” rather than operational costs.

## G. Recommendations

1. **Colleges should approach the topic of science and innovation centres with a realistic perspective.** Although recent analyses have not been done on the success of science and innovation centres, the success rate among announced research parks in the early 1990s was only 50%. Anecdotal evidence about parks that have failed stresses the lack of patience, commitment, and understanding of appropriate university-industry institutional relationships by key leaders and the propensity for legislatures and university governing boards to approve too many parks. (*Technology in the Garden: Research Parks and Economic Development*, pg. 74)

According to Luger and Goldstein, such centres “will be most successful in helping to stimulate economic development in regions that already are richly endowed with the resources that attract highly educated scientists and engineers. This is not to say that regions with less rich endowments cannot

have a high-technology future, but more basic and long-term investments in improving public and higher education, environmental quality, and residential opportunities will be needed first.” (*Technology in the Garden: Research Parks and Economic Development*, pg. 183-184)

2. **Colleges require additional resources and new funding programs to encourage their faculty in innovation, whether that is within the present college structure or through a science and innovation centre.** SAIT is currently developing an innovation plan to create the Prototype Development Fund in the amount of \$3 million per year over a 10-year period. Dr. Alec Bialski has calculated that if only 10 – 15% of SAIT’s faculty members become engaged in applied and project R&D and innovation, it would enable approximately 100 highly skilled individuals to become directly involved in innovation projects. (*Canada’s Technical Colleges: An Untapped Innovation Resource*, pg. 7)
  
3. **Northern colleges interested in further exploring the science and innovation centre concept were encouraged by all those interviewed to link their resources together.** One suggestion was to create virtual networks for specific innovative projects. A possible source of funding that northern Alberta colleges’ were encouraged to investigate as a group was Alberta Innovation and Science’s “Alberta Science and Research Investments Program”. One of the funding streams “Enabling Research Application and Technology Transfer” supports linkages, infrastructure and networks directly related to research application and technology transfer. Another possible funding source for northern Alberta colleges is the Alberta Technology Commercialization Network, a collective group of organizations that assists companies in the technology commercialization process.

## H. Bibliography

### Telephone Interviews and Contact Information

Rick Tofani, CEO, Olds College Centre for Innovation. Phone: 1-877-815-6224.

Bob Wilkes, Director Technology Management, Research and Technology Commercialization, Alberta Innovation and Science. Phone: (780) 427-6620.

Dr. Alec Bialski, Director Innovation and Technology Development, Southern Alberta Institute of Technology. Phone: (403) 210-4409.

### Published Sources

Luger, Michael I. & Goldstein, Harvey A. *Technology in the Garden. Research Parks and Regional Economic Development*. Chapel Hill & London. The University of North Carolina Press, 1991.

Sorenson, Jean. "Discovery Parks leader in R&D". *Journal of Commerce*. February 4, 2002.

Wendy Stueck. "Hopes High for Victoria Tech Park". *The Globe and Mail*, April 23, 2002.

Temple, Peter. "Science Parks: Growth of Science Parks Since 1981 Has Been Huge". *Investors Chronicle*, May 19, 1995, vol.112, number 1425, pg. 76.

### Unpublished Sources

Bialski, Dr. Alec M. *Canada's Technical Colleges: An Untapped Innovation Resource*. Conference Presentation. Southern Alberta Institute of Technology. 2001

### Websites

Edmonton Research Park. [www.researchpark.ede.org](http://www.researchpark.ede.org)

International Association of Science Parks. IASP News.

Olds College Centre for Innovation. <http://occi.oldscollge.ab.ca>

UK Science Park Association. [www.ukspa.org.uk](http://www.ukspa.org.uk)

University of Calgary Research Park. <http://strategis.ic.gc.ca/SSG/tf00108e.html>

**Report on  
Science and Innovation Centres**

**Appendix A**

**Results of Literature Search**

**Part 1**



Calcutt MacL  
April 23/02

# Hopes high for Victoria tech park



Newly opened research facility meant to nurture region's fledgling technology sector, aid local learning institutions, lead to other economic benefits, **WENDY STUECK** writes

Victoria is perhaps best known for tea and crumpets, mild weather and, for a few weeks earlier this year, as the home of "Camp Campbell" when protesters set up tents in front of the provincial legislature to protest against Liberal Premier Gordon Campbell's cutbacks.

"Technology hub" doesn't spring to mind, but some hope that could change with the opening of the Vancouver Island Technology Park, under development for the past two years and officially opened this month.

The facility, comprising just over 160,000 square feet of commercial space, was formerly a residence for adults with physical and mental disabilities that opened in 1971 and closed in 1996.

British Columbia Buildings Corp., the crown corporation that owns the complex and the 14-hectare site around it, began work in 1994 to determine the best use for the facility.

"A research park emerged as the most encouraging option, and eventually we built a business case around it," said Sandy Beaman, general manager of the technology park.

That business case holds that provincial support — to the tune of \$11.9-million worth of renovations and improvements — will pay off in

ture the region's fledgling technology sector, create co-op learning opportunities for students and thereby boost local learning institutions, and lead to other economic benefits over time.

Spending for the facility was approved under the previous NDP government, but Mr. Campbell, who won a landslide election victory last May, did not pull the plug and Liberal MLAs attended recent opening ceremonies for the park.

Regardless of its political roots, the park is getting a warm welcome from industry observers.

"We have never had a place where you could say there was a focal point [for technology]," said Doug Taylor, president of the 600-member Vancouver Island Advanced Technology Centre. "One of our problems here is letting people know that there is great technology going on."

Some critics, however, object to the province pouring money into a tech park while it cancels early-stage technology funding programs.

The project suffered from bad timing as its space began to come onto the market as the technology market was in a funk and many companies were either cutting back or cancelling expansion plans.

Currently, the facility is about 20-per-cent leased, with deals



DIANA NETHERCOTT/THE GLOBE AND MAIL

Sandy Beaman, general manager of the Vancouver Island Technology Park in Victoria: 'A research park emerged as the most encouraging option, and eventually we built a business case around it.'

under discussion.

Mr. Beaman said planners expected it would take up to five years for the project to be fully leased.

The park is expected to build strong links with neighbouring schools and colleges. One of Camosun College's two campuses is nearby, and the park is a 15-minute drive from both the University of Victoria and Royal Roads University.

Renovations and site improvements to the park followed the latest "green" building guidelines and made it the first project in Canada

to be certified under the U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) rating system.

Some of the sustainable factors at the park include a parking lot that features grass, gravel and interlocking plastic bricks. The system filters harmful compounds from storm water and allows it to be discharged into the water table.

The park is also outfitted with thermal heating loops that will store excess heat from tenant areas or computer rooms and make it available for morning warmup in-

stead of heat from gas-fired boilers.

Mr. Beaman said the green approach costs less, not more, due to several factors, including hiring a specialized demolition company that salvaged and sold nearly every thing on the site and submitted a bid that was substantially lower than those of conventional demolition and construction teams.

"Our budget was set prior to deciding to pursue the green technology," Mr. Beaman said. "But [the park project] demonstrates that it doesn't have to cost more and, in fact, can cost considerably less."

**Discovery Parks leader in R&D**

<b>Title</b>	Discovery Parks leader in R&D
<b>Publication</b>	Journal of Commerce
<b>Citation</b>	v.91(9) F 4'02 pg 3
<b>Authors</b>	Sorenson, Jean
<b>Subjects</b>	Business parks -- British Columbia; Research and development -- British Columbia
<b>Corporation Name</b>	Discovery Parks Inc.
<b>Special Features</b>	Illustrations
<b>Publication Type</b>	Research and development; Journal article
<b>Publication Date</b>	2002/02/04
<b>Word Count</b>	1385
<b>Accession Number</b>	5309953
<b>ISSN</b>	0318-8345
<b>Language</b>	English

**Fulltext:**

[Graph Not Transcribed]

As B.C. builds a world-wide reputation for its research and development achievements, such efforts are also creating a construction boom with new research parks springing up at campuses and other sites. This construction surge is being fuelled by Discovery Parks Inc., an organization dedicated to providing facilities that provide for the transfer of academic research and emerging technology thru to start-up companies that need to be near researchers. DPI constructs the buildings and leases them to tenants, using revenues to further develop sites for R&D-related ventures. Currently, DPI has five, new multi-storey structures under or close to construction which represent a total combined value of \$65 million in capital expenditures, a major boost to B.C.'s construction industry. In addition, another two - valued at \$40 million - are in preliminary planning phases at Discovery Place Research Park located in Burnaby.

Those new buildings are only a fraction of the development that this private Canadian company (which started as a B.C. government foundation) has been able to achieve since its 1979 incorporation. It now has 17 buildings located on sites accommodating 41 companies and employing 3,500 scientists, technicians, and professionals. They produce a wide range of high-tech product for world markets in fields such as biomedical, electro-optical imaging systems, marine navigation, digital telecommunications, computerized banking systems, laboratory testing processes, video game software and more. DPI has six sites in the province where it has constructed or is constructing new facilities. Its 32 year history of success has evolved a formula that drives forward incubator ventures.

DPI's Tom Douglas says the intent of Discovery Parks, which long ago dropped any government links, will be to continue to align itself with post-secondary academic or research institutions in order to build for new emerging R&D ventures on campuses today. The benefits go beyond simply providing companies and researchers with office and lab space, but creating a developmental environment where developing companies have access to an institution's knowledge pool and resources, including students

who benefit from such exposure as well as obtaining employment. Tenured professors and researchers also need to remain close to their faculties in order to fulfil classroom obligations. Research parks become the ideal bridge between the classroom and the start-up company.

DPI stepped into the breach to provide these buildings for the R&D industry sector because it is difficult for most developers to do so. Douglas says demand for building space can materialize almost overnight as research grants are firmed up or new research findings spur new product interests. Or, a company may decide it no longer needs to be on campus and wants to move off but still requires lab space. "Our buildings are purpose built, many of which include the unique requirements of biotech research companies," says Douglas. The development of the False Creek Research Park was a means of supplying those purpose-built, but off-campus facilities for maturing R&D companies moving into the commercial field.

Here's a rundown of what DPI is doing at the various sites:

- Discovery Place Research Park - This is the 80 acre Burnaby park, located adjacent to the B.C. Institute of Technology, that provided the seed money for the foundation to expand and develop. There are 11 buildings on site. A three-storey, multi-tenant building providing 50,000 square feet of space started construction in May, 2001, and plans are drawn up for the last two construction sites totalling 267,000 square feet for either multi-or single-tenant buildings. These two buildings will have a construction cost of \$40 million and an estimated value of \$50 million.
- University of B.C. - Two new multi-tenant facilities plus a renovated building have been completed for a total of 130,000 square feet of space. A fourth, 108,000 square foot multi-tenant building is planned with construction to begin in spring 2002 yielding a March, 2003, completion date. The project's value is estimated at \$20 million. This building will have wet-lab facilities helping to ease the shortage of this specialized space in today's industry market, says Douglas.
- Simon Fraser University - Two buildings now exist on university-leased land (one new building plus a purchased building.) A third multi-tenant building is planned consisting of 54,000 square feet with construction expected to start in the spring of 2002 and having a project value of approximately \$10 million. The project will be tendered.
- False Creek Research Park - An exciting new phase of DPI's work as it steps away from campus links to capture mature high-tech companies that have graduated from a campus environment. This downtown Vancouver site in the False Creek Flats provides links to business but is still close to campuses. Construction is underway on the first of four multi-tenant buildings which started in June, 2001. The first building consists of 75,000 square feet with Angiotech Pharmaceuticals becoming the anchor by subscribing to 75 per cent of the occupancy space. This first phase is to be ready to start tenant improvements by February, 2002. A second building is in the planning phase which is identical to the first. Total project cost is \$30 million. "False Creek is targeted to the health sciences research field," says Douglas. When fully developed the park will provide 300,000 square feet of multi-tenant space.
- B.C. Institute of Technology - The new 32,000 square foot multi-tenant building - Technology Place @ BCIT - finished construction in 2002 and housed a first for Canada. The building features an alternative current solar power system - the "photovoltaic" system developed by BCIT's Photovoltaic Energy Applied Research Lab (PEARL). The system connects to provincial power, allowing researchers to field test and refine the system. No new construction is planned at this time.
- University of Victoria - In the planning phase is the development of a 30,000 square foot multi-tenant

facility on the campus. This project will have a \$5 million value and construction is expected to start in a window between March and June, 2002 and be completed before the end of 2002. The project will be tendered.

In addition, there has been discussion initiated with a major B.C. hospital to determine the feasibility of establishing a research park next to it and facilitate greater transfer of research from local health sciences projects. DPI will consider a range of different locations for research and development facilities such as suburban redevelopment projects, recreational properties and medical facilities. Such ventures inject an important new source of employment, tax dollars, and contracts into the host community.

Douglas says tapping the construction skills to produce these purpose built structures is not difficult in B.C., which has a good supply of available contractors to handle the high-tech buildings.

The only areas where shortages are seen is within the concrete forming industry as contractors have shifted to Alberta's more buoyant economy and also in the millwright industry as B.C. companies are often engaged in filling U.S. orders.

The route DPI has chosen, in several cases, to construct these unique buildings which often include specialized venting systems, wet labs, and other high-tech computer features is to move to a construction contract method rather than using a general bid process. "We decided to go that route because there was a lot of costing involved," says Douglas, adding there was more detail needed than could be obtained from conventional bidding backed on an architect's estimates. Research buildings, especially those with wet-labs, have a cost that is approximately 30 per cent above conventional buildings, a feature that can make mistakes expensive. DPI is the only developer providing speculative wet-lab facilities for the market place today, says Douglas.

Douglas says the construction contract method uses a general contractor overseeing each phase of the project but each phase is circulated to a few contractors first to get ballpark estimates.

It was then re-circulated to the general contractor's bidlist of sub-contractors. This process allows Douglas and others at DPI to pace the building's cost. Douglas says the bids coming in and the actual cost of doing the work is very close to the original estimates.

Costing remains a vital consideration for DPI, which relies upon revenues from rentals to create new investment opportunities for further research facilities. Those investments require a long-term view requiring years of preplanning. The end-users on the other hand emerge quickly - much like a hatch - within an incubator.

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\*\*\* END OF RECORD \*\*\*

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**Record # 1**

**Author :** Luger, Michael I. (Michael Ian)

**Title :** Technology in the garden : research parks and regional economic development /  
Michael I. Luger & Harvey A. Goldstein.

**Published :** Chapel Hill : University of North Carolina Press, c1991.

**Paging :** xx, 242 p. : ill., map ; 24 cm.

**Subjects :** Research parks--United States--Case studies.

**Bibliographic :** Includes bibliographical references (p. 225-232) and index.

**Other Entry :** Goldstein, Harvey A.

**ISBN :** 0807820008 (alk. paper) 0807843458 (pbk. : alk. paper)

**LCCN :** 91050255

**Holdings :** **Detail**

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**Report on  
Science and Innovation Centres**

**Appendix A**

**Results of Literature Search**

**Part 2**





Edmonton Public Library

Business Index ASAP

**Subject: Research Parks Subdivision: usage**

**Citations 1 to 2**

Select all items on this page

**ASM Lithography picks Tempe Research park.** (ASM Lithography Inc.) M  
Mark Netherton.

*The Business Journal - Serving Phoenix & the Valley of the Sun* Feb 27,  
v18 n19 p25(1) Bus.Coll.: 108P5113.

View text and retrieval choices (492 words)



**Science parks: growth of science parks since 1981 has been huge. Each on  
Mark its success from a number of unique factors.** Peter Temple.

*Investors Chronicle* May 19, 1995 v112 n1425 p76(1)

View abstract and retrieval choices

**Citations 1 to 2**

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## Dow Jones Interactive

### Science parks

05/19/1995  
Investors Chronicle  
Financial Times Business Reports Business File  
P. 76  
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Although rarely mainstream relocation destinations, science parks fulfil a useful niche in the business start-up and inward investment scene. But generalising is difficult. Many science parks have their particular idiosyncrasies.

The basic concept is that a park is located close to or within a university campus, with which it has both formal and operational links, and for which it provides a means for academics to pursue research ideas with commercial applications. But, though a university connection is common, it is not essential. The 115 acre Belasis Hall Technology Park in Cleveland, with around 80 tenants, grew from an earlier ICI R&D facility on the site.

There are now some 51 'live' science parks operating in the UK, and more than 200 in Europe. The latest additions are the Wavertree Technology Park in Liverpool and the York Science Park.

The UK figure has grown from just two in 1981. Investment in science parks in 1994, actual and earmarked, totalled some pounds 650m, split roughly equally between government funding, private investment, tenant companies, and local authorities and universities. Science parks currently occupy about 7 million sq ft of space, are host to 1,200 or so tenants, and employ around 22,000 people. Tenants are a mixture of start-ups and hi-tech subsidiaries of larger groups, with a bias towards electronics and telecomms, business services and consultancy.

A common factor to all parks is that the management function is typically concerned with encouraging the transfer of technology and business skills to organisations on site. The key is formation and growth of knowledge-based businesses.

### Venture centres

Those parks set up earliest have generally done best. Later ones, like Cranfield - conceived in the property boom but starting up in 1990 - have turned into slightly different animals. Rated a success, to date Cranfield has only one large tenant, Nissan's European Technology Centre. A venture centre for new start-up businesses may be set up here, if funding can be secured.

Cranfield's David Newens is confident that a sharp upturn in enquiries in the last six months or so can be translated into new tenants who might occupy a small business or 'venture' centre. But, he says, 'there is no typical science park, every one is unique'.

Mr Newens claims that science parks in the southern half of the country tend, on the whole, to attract more tenants, because the high calibre recruits needed for growing technology-based companies tend to prefer locations like this. Parks in Cambridge and Surrey have proved very successful, while Oxford (established in 1991) has a new large park with large tenants like Rand Information Systems and Sharp as well as a raft of 40 or so smaller companies in a venture centre.

Oxford's Heather Knight concurs with Mr Newens about the pull of southern-based parks. 'A south east location has a heavy bearing. Oxford has also had a lot of enquiries from pharmaceutical firms because of our hospital research opportunities.' But others disagree. As Harlott-Watt's Ian Dalton dryly points out, his own park's specialisation in oil and energy-related technology would be difficult to replicate in the Home Counties.

Further south and some way from completion, the University of Greenwich is currently putting the finishing touches to blueprints for a park to be located within a 500 acre site which will include the university's new campus, a hospital and the new Crossways business park, all adjacent to the QE2 bridge at Dartford.

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The construction phase is expected to begin in August 1995 and is expected to take about a year. The park is being promoted by Dartford Borough Council, the University, the local health authorities and the Wellcome Foundation.

Parks in the southern half of the country might be the most popular with tenants but costs can be greater. One reason is parks located in enterprise zones or other depressed areas qualifying for assistance can often attract substantial sums. In Wolverhampton, a park under construction with some pounds 4m of City Challenge cash and a further pounds 5.8m from the EU.

Parks in Wales, according one non-Welsh observer, benefit not just from initiatives like this but also from WDA money, compensation payments related to the regeneration of run-down coalfields, as well as EU and local authority cash. 'The big difference between parks in the UK is that there are those that are true commercial ventures and those that rely on astronomical support.'

Having said all that, some of the longest established and most successful commercial parks, like Heriott-Watt and Cambridge - the latter an initiative from Trinity College - were set up and flourished without any outside funding. 'Development agencies only started to think about science parks when it became clear they could act as a catalyst to regenerate local business,' says Mr Dalton.

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**Science parks and university-industry interaction: geographical proximity between the agents as a driving force**

**Technovation, September 1997, vol. 17, no. 9, pp. 491-502+530(12)**

Vedovello C.[1]

[1]Department of Organisation and Management of Enterprises, Universidade Aberta (Open University of Lisbon), Rua Fernao Lopes, 9-1o esquerdo, 1000 Lisbon, Portugal

**Abstract:**

This paper concerns the links established between industry and university, and the expectation that science parks will strengthen their linkages. It concentrates on the analysis of these links through a case study of a single British science park. It focuses on the argument, extensively used by advocates of the science park mechanism, that geographical proximity between universities and firms will facilitate and strengthen the links between these partners. The fieldwork is based on personal interviews conducted through questionnaires addressed to (i) the park management; (ii) a sample of firms located on the park; and (iii) a sample of host university researchers. The study examines a wide range of possible links in three broad categories concerned with (i) informal links, (ii) human resources links and (iii) formal links. Through a comparative analysis provided by data related to links established with other universities (from the firms' side) and other firms (from the researchers' point of view), it is shown that geographical proximity between the partners is not an important influence--or a driving force--on the existence or strength of links, at least for those related to the research activity (formal category of links), established between university and industry. La presente communication porte sur les liens existant entre le secteur industriel et les universites, et la perspective du renforcement de ces liens par les cites scientifiques. Elle se concentre sur l'analyse de ces liens a travers l'etude de cas d'un certain parc scientifique britannique. Elle se concentre sur l'argument, dont font grand usage les partisans du mecanisme de la cite scientifique, d'apres lequel la proximite geographique entre des universites et des societes industrielles facilite et renforce les liens entre ces partenaires. Les travaux pratiques sont bases sur des interviews personnelles effectuees a travers des questionnaires adresses (i) a la direction des cites scientifiques, (ii) a un echantillon de societes presentes dans la cite et (iii) a un echantillon de chercheurs de l'universite-Hote. L'etude examine un grand nombre de liens possibles dans les trois categories generales: (i) liens non officiels (ii) liens bases sur les

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ressources humaines et (iii) liens officiels. A travers une etude comparee, dont les elements sont fournis par des donnees relatives aux liens etablis avec d'autres universites (du point de vue des societes) et d'autres societes (du point de vue du chercheur), il est demontre que la proximite geographique entre les associes n'a pas une influence -- ou une force agissante -- majeure sur l'existence ou sur la force de liens, principalement de liens relatifs aux travaux de recherche (categorie de liens officiels) etablis entre l'universite et l'industrie. Diese Arbeit befasst sich mit den Verbindungen zwischen Industrie und Universitat und den Erwartungen, dass Technologiezentren diese Verbindungen verstärken werden. Die Arbeit konzentriert sich auf die Analyse dieser Verbindungen anhand der Fallstudie eines einzelnen britischen Technologiezentrums. Der Schwerpunkt der Arbeit liegt auf dem Argument, häufig benutzt von Befürwortern des Technologiezentrenmechanismus, dass die geographische Nahe von Universitäten und Firmen die Verbindungen zwischen diesen Partnern erleichtern und verstärken wird. Die Feldforschung basiert auf persönlichen Interviews, durchgeführt anhand eines Fragebogens adressiert an (i) das Management des Technologiezentrums; (ii) eine Auswahl von Firmen im Technologiezentrum; (iii) eine Auswahl von Forschern der Gastuniversität. Die Studie untersucht einen umfassenden Bereich möglicher Verbindungen in drei breiten Kategorien, die sich mit (i) informellen Verbindungen; (ii) Humanressourcen und (iii) formalen Verbindungen beschäftigen. Anhand einer komparativen Analyse mit Daten bezogen auf bestehende Verbindungen mit anderen Universitäten (auf Seiten der Firma) und anderen Firmen (vom Standpunkt des Forschers) wird gezeigt, dass die geographische Nahe zwischen den Partnern kein wesentlicher Einflussfaktor -- oder Antriebskraft -- für die Existenz oder Stärke von Verbindungen, überwiegend bezogen auf Forschungsaktivitäten (formale Kategorie von Verbindungen), zwischen Universität und Industrie ist. Se consideran los vinculos entre la industria y la universidad y la probabilidad de que los parques científicos refuercen los lazos. Se analiza este tipo de vinculo por medio de un estudio de caso de un parque científico británico en particular. El tema principal es el argumento frecuentemente empleado por los que están a favor del mecanismo del parque científico, es decir que la proximidad geográfica entre las universidades y las empresas facilitará y reforzará los vinculos entre los socios. El trabajo de campo se basa en unas entrevistas personales llevadas a cabo por medio de cuestionarios dirigidos (i) a la gestión del parque; (ii) a una selección de empresas ubicadas en el parque; y, (iii)

Language: English Document Type: Research article ISSN: 0166-4972

DOI (article): 10.1016/S0166-4972(97)00027-8  
SICI (online): 0166-4972179491502+530

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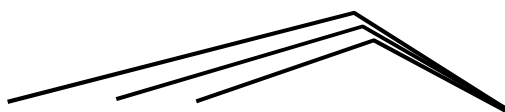
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**Report on  
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**Appendix A**

**Results of Literature Search**

**Part 3**





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**Title :** Science parks and technology complexes in relation to regional development.

**Published :** Paris, France : Organisation for Economic Co-operation and Development, 1987.

**Paging :** i, 38 p. ; 30 cm.

**Subjects :** [Research parks](#)  
Rural development--Effect of research parks on.

**Notes :** "General distribution."  
"... reviews the proceedings of a seminar on science parks and technology complexes." - p. i.

**Other Entry :** Organisation for Economic Co-operation and Development.

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Record # 1

**Author :** Castells, Manuel.

**Title :** Technopoles of the world : the making of twenty-first-century industrial complexes / Manuel Castells and Peter Hall.

**Published :** London ; New York : Routledge, 1994.

**Paging :** x, 275 p. : ill., maps ; 25 cm.

**Subjects :** [Research parks](#)  
[Research parks--Case studies](#).

**Bibliographic :** Includes bibliographical references (p. 260-270) and index.

**Other Entry :** [Hall, Peter Geoffrey](#).

**ISBN :** 0415100143

**LCCN :** 93019343

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**Title :** Science parks and innovation centres : their economic and social impact : proceedings of the conference held in Berlin 13-15 February 1985 / edited by John Michel Gibb.

**Published :** Amsterdam : Elsevier ; New York, NY, U.S.A. : Distributors for the U.S. and Canada, Elsevier Science Pub. Co., 1985.

**Paging :** ix, 477 p. ; 25 cm.

**Subjects :** Research parks--Economic aspects--Congresses.  
Research parks--Social aspects--Congresses.

**Notes :** Summaries in French and German.  
At head of title: Commission of the European Communities.  
Conference jointly organized by the Commission of the European Communities, Directorate General, Information, Market, and Innovation and by the Senate of Berlin.

**Bibliographic :** Includes bibliographies and index.

**Other Entry :** Gibb, J. M.  
Commission of the European Communities. Directorate General, Information Market and Innovation.  
Berlin (Germany : West). Senat.

**Other Title :** Innovative centres.

**ISBN :** 0444425446 (U.S.) : fl 180.00 (Netherlands : est.)

**LCCN :** 85020605

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**Technopolis improves sales and profit.** (Brief Article)

Mark *Nordic Business Report* Jan 29, 2002 pNA  
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**Purdue's Trask fund invests in three start-ups.** (Info Tech). (Purdue Unive  
Mark invests in start-up companies)(Brief Article) Peter Schnitzler.

*Indianapolis Business Journal* Nov 19, 2001 v22 i36 p13(2) Bus.Coll.: 1:  
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**Sponsors to give science scheme 6 million pounds sterling.** (sponsors fund s  
Mark and technology centre in Birmingham, United Kingdom) Richard Wolffe.

*The Financial Times* Oct 28, 1997 p18(1)  
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**Gleitman opposes R&D support.** (Israeli Minister of Trade and Industry Yeh  
Mark Gleitman, government funding of foreign research and development centers in

*Israel Business Today* Feb 28, 1997 v11 n4 p15(1) Bus.Coll.: 100Q0492.  
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**Bank expected to pay off debt for Florida research park.** (Barnett Banks In  
Mark Orange County, Florida) Christopher McEntee.

*The Bond Buyer* July 25, 1995 v313 n29698 p2(1)  
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**The county's seven-year headache: political wrangling continues to stunt  
Mark Milwaukee County Research Park's progress.** (Focus on Commercial Real  
Mark Kass.

*The Business Journal-Milwaukee* Oct 2, 1993 v10 n52 p1A(4) Bus.Coll.  
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**Hope or hyperbole? High tech and economic development.** Edward J. Mal  
Mark

*Technology Review* Oct 1987 v90 n7 p44(8) Mag.Coll.: 41K4175. Bus.C  
34W2915.  
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Subject: Research Parks Subdivision: evaluation

Citations 1 to 4

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**A case study of the Virginia Tech Corporate Research Center in the context of the Cabral-Dahab Paradigm with comparison to other US research parks.** An  
Mark Echols, Joe W. Meredith.

*International Journal of Technology Management* Dec 31, 1998 v16 n8 |  
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**R&D 'inputs' and 'outputs' of technology-based firms located on and off site of  
Mark Parks.** Paul Westhead.

*R & D Management* Jan 1997 v27 n1 p45(18)  
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**Towards the maturity stage: an insight into the performance of French  
Mark technopoles.** Isidre March Chorda.

*Technovation* March 1996 v16 n3 p143(10)  
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**Technology-support groups provide tips, benefits; should they do more?  
Mark Report: Technology Quarterly) Patty Tascarella.**

*Pittsburgh Business Times* June 6, 1994 v13 n44 p15(2)  
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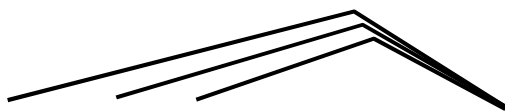
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**Part 4**





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**Subject: Research Parks Subdivision: design and construction**

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**INDUSTRY NEWS: Science Park Seeks Power Maker.** (Brief Article)

**Mark** *Fuel Cell Technology News* March 2001 v3 i6 pNA  
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**Construction Underway On Research Facilities.** (Brief Article)(Statistical I  
**Mark** Included)

*Saskatchewan Business* Nov 1999 v20 i6 p4 Bus.Coll.: 121S0443.  
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**Perfecting the formula.** (Offices and Business Parks)(growing interest in scie  
**Mark** in United Kingdom) Paul Strohm.

*Estates Gazette* Nov 28, 1998 p146  
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**Grand unified theory.** (Granta Park, Cambridge, England, science parks) Jere  
**Mark** Melvin.

*Estates Gazette* Oct 24, 1998 n9795 p60(2)  
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**Korea's answer to Silicon Valley.** (profile on the Songdo Media Valley of So  
**Mark** Korea's Incheon City redevelopment)(Cover Story)

*Business Korea* May 1998 v15 n5 p57(2)  
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**Hopkins plans massive lab.** (Johns Hopkins University) John Lombardo.

**Mark** *Washington Business Journal* Nov 29, 1996 v15 n29 p1(2)  
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**Taking the R&D plunge.** (research and development) Phil Schreiner.

**Mark** *Building Design & Construction* Feb 1992 v33 n2 p56(4) Bus.Coll.: 63V  
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**Forrestal Greens true to tradition of quality.** (in Princeton, N.J.) Margaret

**Mark** *Building Design & Construction* July 1987 v28 p150(4) Bus.Coll.: 32U3  
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International Journal of Technology Management, Dec 31,  
Mark 1998 v16 n8 p721(5)



**The Cabral-Dahab Science Park management  
paradigm: an introduction. Regis Cabral.**

**Abstract:** The Cabral-Dahab Science Park management paradigm is presented and evaluated as a potentially successful university-industry interface. Guidelines are presented for the successful planning and management of a science park. Necessary park features include having access to qualified personnel, markets, having the capability to provide marketing, managerial expertise, selection of firms and protection for trade secrets, having a clear identity, a highly powerful and visible manager, a considerable number of consultancy firms, government backing and financially capable managers.

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### Technology-Based Firms Located on Science Parks: the Applicability of Bullock's 'Soft-Hard' Model

Enterprise and Innovation Management Studies, 1 May 2000, vol. 1, no. 2, pp. 107-139(33)

Westhead P.; Batstone S.; Martin F.

#### Abstract:

Property-based initiatives or 'incubators' such as Science Parks (adjacent to universities) have been established by their sponsors to promote higher education institute (HEI) and industry linkages as well as the formation and development of technology-based firms. Science Parks reflect an assumption that technological innovation stems from scientific research (for example, in a HEI) and that Parks can provide the catalytic incubator environment for the transformation of 'pure' research into production, generating the externality benefits within the Parks and the local economies. An extension to the linear model of innovation is provided by Bullock (1983). This study explores the applicability of the Bullock model which suggests firms established to provide 'soft' services transform over time to provide 'hard' manufactured products. A comparative static data set of technology-based firms interviewed in 1986 and 1992 located on and off Science Parks in the UK is explored to test presented hypotheses. The Bullock model is not supported. Nevertheless, 'soft' and 'hard' Science Park firms are found to make a contribution to wealth creation and job generation. The policy and research implications of the research findings are discussed.

**Keywords:** TECHNOLOGY-BASED; FIRMS; SCIENCE; PARKS; BULLOCK; MODEL; DEINDUSTRIALIZATION; FIRM; PERFORMANCE

**Language:** English **Document Type:** Research article **ISSN:** 1463-2446

**SICI (online):** 1463-2446(20000501)1:2L:107;1-

**Publisher:** ▶ Routledge, part of the Taylor & Francis Group

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**1. Technology-Based Firms Located on Science Parks: the Applicability of Bullock's 'Soft-Hard' Model**  
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Enterprise and Innovation Management Studies, 1  
May 2000, vol. 1, no. 2, pp. 107-139(33)  
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Beyond the linear view of innovation in science park evaluation An analysis of Western Australian Technology Park  
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Abstract:  
Science and technology (S&T) parks have been viewed sceptically in much of the academic literature when judged in terms of technology development or urban renewal. S&T Parks have been criticised for relying on an outdated, linear, model of innovation, which assumes that scientific knowledge can be transferred unproblematically from a research university to an adjacent Park for development. Innovation is now widely recognised as a complex non-linear process involving feedback loops and the creation of synergies through a diverse range of information networks. However, much evaluation of S&T Parks continues to implicitly use a linear framework by concentrating on the direct transfer of knowledge from universities to Park companies, and has a fairly limited conceptualisation of whether interaction is occurring or not. This article moves beyond the linear approach by examining interaction and networking within Western Australian Technology Park (WATP), as well as between WATP companies and universities. It also compares the situation in WATP with the findings from a study by Vedovello of Surrey Research Park. It finds that there is more interaction occurring than might be estimated using the traditional evaluative model and identifies several different categories of company which exist at the Park, in terms of their interactive behaviour.  
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article summary

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The screenshot shows the Ingenta website interface. At the top, there is a navigation menu with links for 'home', 'about ingenta', 'about this site', 'site map', 'help', and 'contact us'. A user profile for 'Susan Mikytyshyn' is visible with a 'sign out' link. The main heading is 'article summary'. Below this, there are navigation controls: 'FIRST', 'BACK', 'document: 55 of 98', 'FORWARD', and 'LAST'. A search bar is present with a search icon. On the left side, there is a vertical menu with links: 'ingenta search', 'ingenta articles', 'ingenta plus', 'ingenta publications', 'ingenta searches', 'ingenta list', 'ingenta cart', 'ingenta my ingenta', and 'ingenta orders'. The main content area displays the article title 'Business Incubation: International Case Studies', the source 'OECD/OECD/Studies/Industry, Services & Trade, September 1999', and the publisher 'OECD Organisation for Economic Co-operation and Development'. An 'Abstract:' section follows, containing a detailed paragraph about business incubation. Below the abstract, it lists 'Page Count: 180', 'Figure Count: 11', and 'Table Count: 8'. The 'Language' is 'English' and the 'Document Type' is 'Review article'. The 'Publisher' is 'OECD - Organisation for Economic Co-operation and Development'. At the bottom, a URL is partially visible: 'http://www.ingenta.com/isis/searching/ExpandSearch/ingenta?year to=2002&year from=1997&date type=range&journal type=4'.