

# **Detection of Best Practices in the Field of University Entrepreneurship**

An analysis of 13 European centers of entrepreneurship

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## PREFACE

The University of Girona is a young institution with no more than a decade in existence. While its Technology Transfer Office was created at the very beginning with the aim of serving the academic community in innovation and commercial matters, it was only 12 months ago that it expanded its operations to promote and support the creation of university-based spin-offs. This new structure is directly sponsored by the Catalan Government as part of its Innovation Plan aimed at increasing economic activity in a series of high tech sectors with the aim of generating high value-adding jobs. This is not unlike the efforts seen in many other countries. This financing backup has allowed the University of Girona to carry out this study of best practices in the field of entrepreneurship in Europe.

Our thanks go especially to all the centers and persons visited, who very kindly donated their time, patience and expertise in helping us better understand how entrepreneurship within the university environment is understood and managed today in Europe.

This report must be put into context, considering the little experience that the University of Girona has in this field. It was first conceived to be a learning experience for our university at a moment when our entrepreneurship support program is taking shape. Therefore, some of our findings may be evident to those with a long-standing track record. Nevertheless, we feel most people can benefit from the wealth and diversity of experiences analyzed in our study.

As a recommendation, and given the time constraints that everybody experiences nowadays, we recommend reading first through the list of best practices identified. One may then decide to go into further detail by reading the individual center reports, as desired. It is having in mind the realistic time availability of people in spin-off support units that we decided to put the over 60 best practices detected straight up front. Our aim in detecting these was to provide *applicable* policies in the field of entrepreneurship management, which can lead to tangible improvements of a center's operation and results. We did not want this study to be theoretical in nature but very much practical and implementable.

## **BEST PRACTICES DETECTED**

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The following list does follow any order that may signal our opinion on the importance of one best practice over another. It is completely random and we have made no effort in classifying them.

1. Utilize your immediate environment resources (extend your practice further with *coordinated* collaboration with other organizations related to spin-off promotion. It is also cost effective)
2. Secure a source of Entrepreneurs (most researchers are not entrepreneurs. Furthermore, the entrepreneur profile is in general scarce. Locate a reliable source of entrepreneurs such as business schools or *create* your own entrepreneurs through an entrepreneurship studies program)
3. Understand that new venture creation is about implementation (This is a hands-on business. It's about proactivity. It demands good project management skills. The best plan is useless without a good implementation.)
4. The essential building blocks of a spin-off (Team, Knowledge and Capital / All new companies need them and new venture creation can be viewed as matching or acquisition process of a few essential elements. In a way, support staff should act as "brokers" for these elements)
5. Avoid losing the few valuable opportunities (communicate the importance of NOT publishing before addressing the TTO. Also, make sure research lines and projects are not redundant or obsolete, taking into account what is being done outside of your institution)
6. Run the entrepreneurship center like a business (Chalmers: "we are a company factory". Do so independently of having considerable economic support)
7. Layout your process (understand and communicate what researchers should know, expect and do chronologically)
8. Deliver what you claim (are you really providing the quality services that you claim? In some cases, there may be more marketing than substance)
9. Build critical mass (be less stringent at the beginning if necessary. Also, at the beginning your capacity to manage projects is questionable. Consider a consortia of universities or reaching agreements with other external research organizations like hospitals to reach a minimum number of yearly disclosures. 70-100 are approximately needed to guarantee 3-4 new spin-offs per year)
10. Market yourself (communicating results is important)
11. Focus on comparative advantages and historical expertise of your environment
12. Cut your losses short (like any investment, reevaluate involvement at different stages. Ask yourself if you would again invest knowing what you know now. Have a filter evaluation on a regular basis to move each project to a major next step)
13. Find the right product-market combination (these two elements are inseparable; an opportunity is only real if you have both a superior applicable technology and a market for it.)
14. Provide standard and personalized services (some processes are simple, common and can be standardized, some cannot / same can be said about the information entrepreneurs need)
15. Utilize industry joint-ventures (it diminishes risks, adds credibility and provides a distribution channel into the marketplace)

16. Adopt the figure of the Project Manager or Business Development Manager (it benefits the structure and the spin-off / Profile being: Doctor + MBA + industry experience + knowledge in new product commercialization. “Learning by doing “ is the best way to professionalize your staff)
17. Professionalize your staff (“a blind man should not lead a blind man”)
18. Isolate the investment decision-making process (do not invest based on having to meet objectives, etc. It will endanger the exit of the project in the long run)
19. Measure results qualitatively over quantitatively (prioritize on long-term survival ratio over number of companies founded or similar statistics)
20. 1<sup>st</sup> Priority is protecting technology (3 options: patent, confidential agreement or industrial secret)
21. A TTO has 2 clients: entrepreneurs and investors
22. Understand the business model of new venture creation (“self-sustainability can be reached in one hit” / I personally like to compare it to the movie industry in terms of income distribution. This means that a long term planning and view is needed)
23. Each stage of development has different needs
24. Determine if you can afford to be passive about promotion and generating a deal flow (if so, do so to focus on core-competencies. If not consider outsourcing)
25. “Don’t confuse self-belief with reality” (QUBIS)
26. Consider having an in-house accounting/financial planning practice (helps eliminate financial risk, provides transparent information about the situation of your companies and a source of income)
27. Do not be afraid of taking calculated risks
28. Too much of a good thing is bad (understand the degree of implementation that a policy demands. For example, proactivity and pressuring an entrepreneur is good up to a point, needing to much hand-holding or leadership evidences a team weakness. Also, too much financing may lead to artificially sustaining a venture)
29. Make sure expectations are realistic (make sure stakeholders understand the business and are realistic about expectations as well as you are. Consolidating a good project can take up to 15 years.)
30. Focus on getting to break-even as soon as possible
31. Put disclosures in writing (including the ownership distribution of researchers and an agreement of confidentiality)
32. Be aware of the tendency of putting one’s opinion over the one of the entrepreneur
33. Create creative tensions (act as a banker, friend, critic or shareholder to your entrepreneurs)
34. Look for VC’s that offer more than capital
35. Lobby key people at the university (to generate more disclosures and for institutional backup)
36. Understand the difference between *creating value* and *cashing on value* (usually there is not an obvious exit; you must work on reaching liquidity)
37. Try to have at your disposal important sources of funds (more money means being able to diversify and the opportunity to take bigger gambles)
38. Credibility has a value (Isis “sells” *future* spin-offs to its sponsors of lines of research, departments or facilities. This is a very interesting proposal if one can reach such agreements. You gain income predictability)

39. Allow project managers to jump to the private sector with the spin-off (if there is a readily available supply of people with the needed qualifications. It improves the success chances of the spin-off)
40. Consider your suppliers as a potential source of income (commissions, service discounts, free “community service” mentality or investment on future clients)
41. Focus on core competencies (focus on selection and support duties. Consider outsourcing promotion and education, specially with limited resources)
42. Manage participation carefully to avoid de-incentivating entrepreneurs
43. Absorb information from other areas that work with research
44. Have a short business plan or strategy to reach your objectives
45. Determine your market (service mentality vs. business mentality)
46. Find or create your exit (a seed fund is a solution)
47. ‘Time-to-market’ (While a topic, accelerating the entry of the new company into the marketplace is crucial in guaranteeing its capacity to compete effectively. This fact reinforces the theory of the importance of being proactive as a support unit. In some fields, such as the scientific-technological it is of the utmost importance).
48. Network and collaborate (Leeds = 22 in staff, 80 collaborators)
49. University new venture creation is different from new venture creation (there are some pro’s and some con’s. Understand your weaknesses associated with the university community)
50. Utilize relevant industry expertise in your selection process
51. Incubation is a real estate business and a non-core competence if it can be outsourced
52. Utilize your portfolio of spin-offs (spin-offs can generate other spin-offs. The should also provide help, expertise and networking for new projects)
53. Success of a spin-off program depends on research (This may be a non-manageable variable for a TTO. Nevertheless, it is clear that quality and quantity of research should result in better spin-offs.)
54. There are no secret formulas or miracle best practices (Everybody does more or less the same. It is quality of the information (*investigation*) and the how knowledgeable your staff is (*experienced good people*) that determine the quality of your decisions, and consequently the ability to improve your spin-off survival ratio)
55. Maintain a close communication line with the research community
56. Participate in the Board of the new companies (for supervision purposes as well as for follow-on advise to them)
57. Let researchers be researchers (“we don’t want to loose a good investigator and the company doesn’t need to gain a poor manager” QUBIS?)
58. University spin-offs tend to develop research related products (Many products or solutions respond to university needs or general research needs. For example, investigation equipment. This may or may not be good. Individual assessment is needed)
59. Secure two sources of income for the university (shares and royalties)
60. If they do well, you will do well...
61. Some Random Key Success Factors:
  - a.  $T \times M = 0$  if  $M = 0$  (Technology and Market)
  - b. Team must have a clear long-term focus
  - c. Pick projects that do not depend on a single product / service or that have the capacity to generate a pipeline

- d. Demand entrepreneurs to assume personal risk (financial or professional)
- e. Move highly active contracting groups that can generate products up the ladder into spin-off territory
- f. Make entrepreneurs write their business plans
- g. Projects must be global in scope (all patent buyers are international / QUBIS = 95% of projects are a global product for a global marketplace)

## **INDIVIDUAL CENTER REPORTS**

# CHALMERS INNOVATION



Chalmers Innovation was visited on the afternoon of July 4<sup>th</sup> 2002. Mr. Ulf Svenson, business development manager, and Mr. Olle Stenberg, director of the center, attended the meeting. Additional material for this report has been provided directly by Chalmers Innovation. Supplemental sources are listed in the bibliography.

## **1. Introduction**

Chalmers Innovation (CI) introduces itself as the textbook definition of what a business incubator should be. The center defines its role of business incubation as "... a dynamic process of business development. Incubators provide hands-on management assistance, access to financing and orchestrated exposure to critical business or technical support services. They also offer entrepreneurial firms shared office services, access to equipment, flexible leases and expandable space."

In fact, Chalmers Innovation, located at the Stena Center near the campus of Chalmers University of Technology in Göteborg, does deliver on its promise by involving itself deeply into the complex process of creating new companies. CI offers a sophisticated array of support services that go well beyond the office rental mentality that characterizes the operation of many incubators. In short, CI has a hands-on approach to business creation, having the reduction of *time-to-market* as its outmost priority.

CI was founded in 1997 thanks to a generous 50MSEK (5€ million) donation from the Sten A. Olsson family foundation. Securing a major sponsor has allowed Chalmers Innovation to invest 35MSEK in turning some old premises in today's Stena center, a well-equipped 4000 m<sup>2</sup> incubator with capacity for 30 to 40 companies. This center is currently running at full capacity, which has prompted CI into launching a new facility located in Göteborg's new IT cluster, Lindholmen docklands. This new technology park is home to companies focusing on wireless communications, telematics and new media. Additionally, Chalmers and Göteborg universities have partnered to create a new IT university within this park. The Lindholmen incubator, inaugurated in August 2000, has 900 m<sup>2</sup> and can hold approximately 5-10 start-ups. Further facility expansions are possible and deemed likely at this point in time.

During its 5 year lifespan, Chalmers Innovation has accepted 33 spin-off projects, with an outcome of 12 graduated companies (operating independently after leaving the incubator). Only two of these have shut down. CI's spin-offs have generated 45 patents. During the economic cycle peak, these companies employed over 300 people. This figure has now shrunk to about 200.

Financial self-sufficiency has not yet been reached, while it remains a stated goal of management. Chalmers Innovation has secured over 50€ million in venture capital financing for its spin-offs. Government seed financing amounts to 3€ million.

Finally, it is important to note that Chalmers Innovation is located in a so-called entrepreneurial hotbed of northern Europe and that its private status, as a non-profit foundation, allows for greater flexibility and independence compared to a university-based entrepreneurship center.

## **2. Internal Organization**

Chalmers Innovation employs 7 full-time people with the following responsibilities:

- Olle Stenberg, President
- Hanna Carlsson, Stena Incubator Manager
- Jörgen Hansson, Lindholmen Incubator Manager
- Ninni Lange, Reception & Office Services
- Henrik Jansson, Business Development / Training
- Andrzej Brud, Business Development / Financing
- Ulf Svensson, Business Development / P.R. & Marketing

Additionally, CI has contracted a series of external resources to complement its offer of support services to its tenants. The 2001 breakdown follows:

- Legal advice, 800 hours
- Business development advice, 400 hours
- Auditing services, 300 hours
- Financial advice, 250 hours

Possibly, the best way to quickly convey how Chalmers Innovation is organized and how it operates is to follow chronologically the internal process its spin-offs follow once a project has been accepted. In fact, this process has changed over the years as CI's management saw the need to subdivide its incubation practice in two phases: *pre-incubation and incubation*.

The pre-incubation phase is intended to help define the business model and structure of a spin-off as opposed to product development and commercialization, which is the focus during the incubation phase. Pre-incubation typically last 3 months with a maximum time allowance of 6 months. One of the main objectives of pre-incubation is to produce a business plan, allowing the new company to introduce itself to seed investors. Chalmers Innovation assigns a full-time project manager to each pre-incubation project. Typically, this is a student from the Chalmers School of Entrepreneurship. This school was founded also in 1997 and aims to educate future entrepreneurs during a one year program in which theory and practice are mixed with the aim of developing a technology-based idea into a real life business. Students are expected to launch a company by the end of the program. The initiative to create a school for educating future entrepreneurs originated after conducting a study that pointed out that the most sought-after input in new venture creation was the entrepreneur, above financing and good ideas.

Additionally, the new venture is further supported by one of the business development managers of Chalmers Innovation which acts as a coach of the project. His or her duty is to supervise with weekly meetings the progress of the project and to accelerate its development pace. During pre-incubation, Chalmers Innovation only receives in exchange for its facilities and services rendered an equity stake. Typically 5% to 15% based on the risk premium associated with the project.

The incubation phase is reached once a venture capital firm or private investor joins the project. This seems to be a practical measure for assessing if a project has reached the maturity needed to move to the second phase. It also happens to signal the first major turning point in which a project either folds or moves forward. The incubation phase can last up to 3 years. During incubation, CI charges market level lease rates for its office space, which now hover around 170€ per m<sup>2</sup> plus an additional 40€ per m<sup>2</sup> for the supplied office services (described in the following sections). Leases are kept short, usually 3 months, to allow for flexibility in adapting to the size changes the new company will likely experiment.

During incubation, Chalmers Innovation will take an additional 5% stake in the company. It is important to point out that tenant companies are tied to Chalmers Innovation for the duration of their early development. In other words, once a Spin-Off initially enters the pre-incubation program, it is contractually required to stay with CI and go into the incubator phase if they are accepted for it. In general, Chalmers Innovation spends a maximum of 30.000€ per project, which includes the salary of the entrepreneur/project manager. CI does not “purchase” its company participation with cash, only in exchange for services and facilities.

### **3. Creating New Companies at Chalmers Innovation**

#### **A. Promotion of the entrepreneurial culture**

One of the differentiating factors of Chalmers Innovation may reside in its ability to generate a large dealflow of potential spin-off initiatives. Not only is there a large number of the instruments specifically designed for this purpose, but also, CI does not in any way restrict its activity to university proposals coming from Chalmers University of Technology. In fact, industry spin-offs as well as spin-offs coming from other universities such as the University of Göteborg are targets of the incubator.

The main generator of business ideas comes from a business plan competition called **Venture Cup**. Venture Cup originated a few years back to stimulate economic development of Western Sweden. It has been so successful that its scheme has been expanded to all of Scandinavia. Right now there are five Venture Cup competitions spread by geographical coverage; Eastern Sweden, Western Sweden, Oresund region, Norway and Finland. Venture Cup Western is organized between the universities of Chalmers and Göteborg, the Technology Link Foundation and McKinsey & Company. Venture Cup Western has produced around 300 proposals and represents 60% of CI spin-offs. In total, Venture Cup has had over 800 participants resulting in the birth of 70 new high growth companies and about 350 new jobs.

Prize money is only one of the incentives that this competition offers. Venture Cup also represents a learning opportunity for entrepreneurs through a number of lectures, both

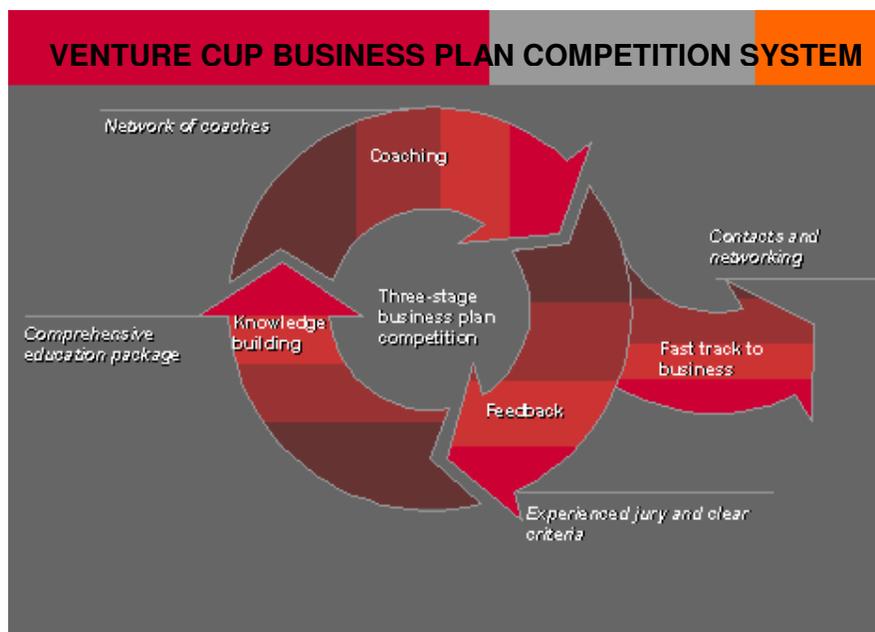
inspirational and educational from experienced entrepreneurs, business people and consultants. These individuals are also mentors of the projects and are at the disposal of the entrepreneurs.



Venture Cup is organized in 3 stages as follows:

	<b>Step 1: Business idea</b>	<b>Step 2: Marketplan</b>	<b>Step 3: Detailed business plan</b>
Requeriments for each step	Description of business idea and complementing data about market, customer benefit and competitive advantage.	Deeper penetration with focus on market evaluation and marketing strategy	Complete, professional and implementable business plan
Prizes	10 x 5 000 SEK	10 x 15 000 SEK	1st prize: 200 000 SEK,  2nd prize: 100 000 SEK,  3rd prize: 50 000 SEK

The following graphic describes the structure of the Venture Cup competition:



The other main generators of dealflow are a 1€ million annual seed financing from the Swedish regional government, the mentioned **Chalmers School of Entrepreneurship** and **Connect Väst**. Clearly the first one serves as bait given that entrepreneurs find limited sources of early-stage financing. As far as the Chalmers School of entrepreneurship, the role it plays in relation to the incubator is crucial. It not only provides its main “product”, entrepreneurs, as described early but also business concepts with high potential are channeled into the incubator.

The last major source of spin-offs, Connect Väst, is the Swedish network (following the original concept of Connect, USA) formed by members of the business community to help, free of charge, developing projects and growing companies. Connect Väst has a clear entrepreneurial philosophy and most of the activities it organizes are intended to provide advice, support and financing to start-ups. Major Swedish companies, consulting firms, business angels and venture capital funds make up Connect Väst. Up to now, this network has helped approximately 70 start-ups resulting in 300 new jobs created through the financing of around a third of them.

As far as the profiles of the entrepreneurs, Chalmers Innovation currently estimates that 25% of its projects come from the private sector. Out of the 75% that originate in academia, approximately 70% of these are research based and 30% are student initiatives.

Finally, an intangible source of new projects is the attitude of the team at Chalmers Innovation, which is committed to going to any event where one may find an entrepreneur with a valuable idea. This is part of the hands-on or active approach to company creation that defines this incubator.

## B. Selection of spin-off projects

As already mentioned earlier, Chalmers Innovation makes no distinction about the origin of the projects it decides to support. Nevertheless its selection process is restrictive in the field of activity; only technology-based companies qualify. In general, its selection criterion is clear and simple. It can be almost summed up by the following sentence that appears in the promotional documentation. “Every company within our incubator has a technology-based business idea with world market potential”. Chalmers is looking for high impact and high growth opportunities. In addition, there are two other indispensable attributes: product or service uniqueness and an entrepreneurial management team. In summation, the essential selection variables of CI are the following:

- Technology-based business concept (IP rights)
- Entrepreneurial management
- Growth-oriented management
- High growth potential
- Uniqueness of product or service
- A business plan (incubation phase)

The selection process again is divided in pre-incubation and incubation. To enter in pre-incubation, candidates must submit a brief description of their business idea and, if selected, they will meet with the full staff of the incubator. Typically, the decision is

given within 48 hours. The incubator's staff will use its vast network of collaborators to help them make an informed decision. 20% of the candidates make it to the meeting stage and 50% of them are accepted in pre-incubation. In general, the pre-incubation process is less demanding than the incubation application. It tends to focus more on assuring idea novelty and ability to protect the technology.

For entry in incubation, Chalmers Innovation has decided to outsource selection in order to guarantee objectivity. After careful examination, management concluded that the close involvement of the incubator staff during pre-incubation disqualifies it as evaluators moving forward.

In summation, the philosophy of the selection process can be described as a willingness to take a calculated high risk. Additionally, given that CI understands the risk dynamics of the sector, it also values the *learning experience* that the process itself represents as a standalone positive outcome. This is especially true during pre-incubation, when there is less at stake and selection criterion is not as stringent. Nevertheless, this philosophy must be balanced with a need to maximize the use of limited resources.

### C. Support and management of start-ups

Chalmers Innovation offers to spin-offs the so-called 3 C's or C<sup>3</sup>: Capital network, Company location and Competence. All of these are provided through CI's philosophy of active coaching and involvement.

CI's capital network refers to the services relating to identifying, selecting and securing financing at a very early stage. Chalmers guides its tenant companies in this difficult process, leveraging its credibility and long-standing relationships with capital providers from all arenas: government, business angels, venture capitalists or industrial partners. While it may not always be possible, Chalmers approaches capitalization as a matching process where it is assumed that a selected capital provider will best meet the necessities of a specific company (and vice versa).

The company location, the incubator, offers a wide range of services and infrastructure available to tenants for a flat rate of 40€. The following is a list of the business services offered in-house:

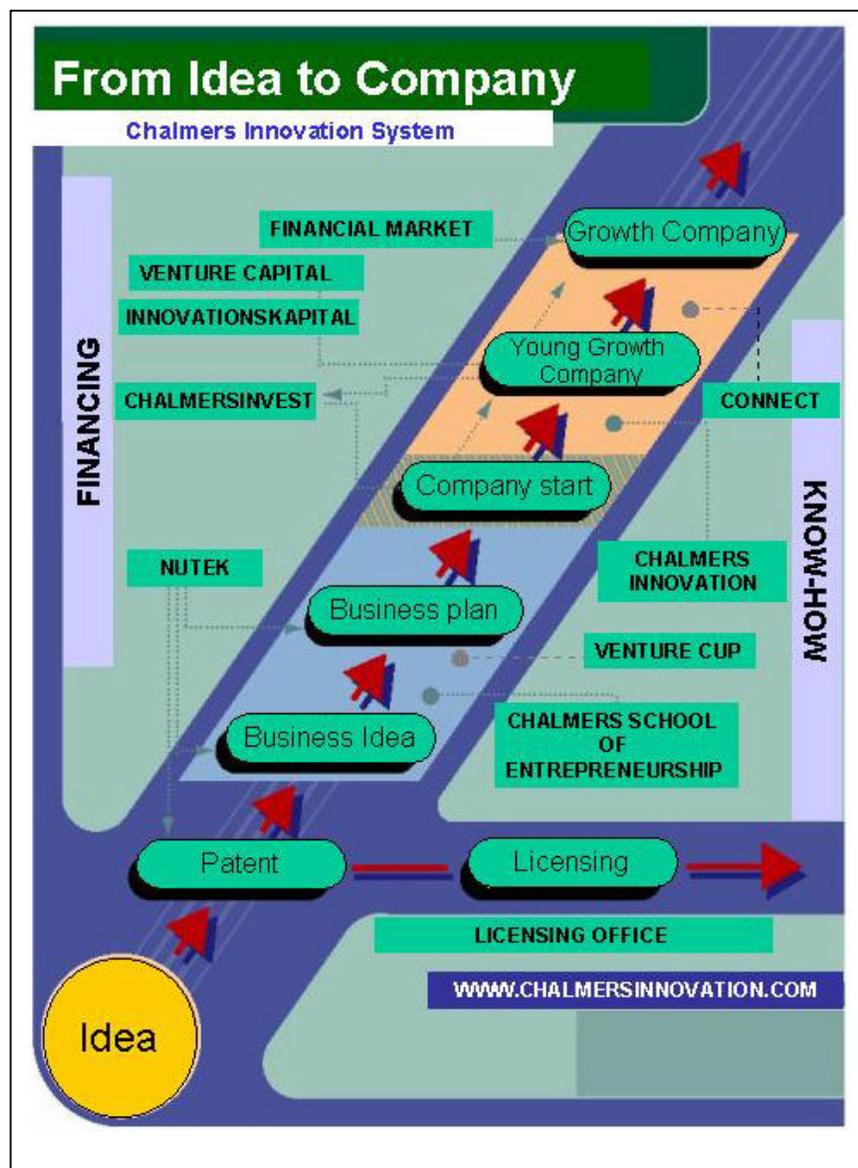
- Reception
- Mail service
- Conference rooms
- Switch board service
- Internet access
- Parking (additional cost)
- Web server
- Office equipment (fax, copying machine, scanner, data projector, color printer, digital camera, etc.)
- Lab space and other special needs arranged upon request

Chalmers Innovation has also selected a list of preferred service providers that are available to tenants in response to specific needs. These include an accounting firm, a law firm, a travel agent, a marketing agency, an IS provider, etc.

Finally, Chalmers offers competence in business development with its staff, training in response to specific needs and a vast network of specialized collaborators. Training is oriented to those areas which may provide the highest impact or benefit to the entrepreneur such as sales and negotiation techniques or project management.

Essentially, what is critical to convey is not necessarily *what* Chalmers offers, which cannot differ much from what most entrepreneurship centers put forward but *how* it provides these services. It is in the emphasis on the *how* that Chalmers creates value for its tenants. And how is proactivity, having a clear goal of speeding up the ramping up process of a new company and being a part of the company and the team for the first few years of its life.

The following exhibit summarizes the building of a new company at Chalmers:



**NUTEK:** Swedish national board for technology development, which provides seed financing in the form of “soft loans” (very favorable terms) through Chalmers, its authorized local agent.

**ChalmersInvest:** a seed stage VC company fully-owned by Chalmers with the intention of filling the financing gap during the first two years of operation, at which point ChalmersInvest exits by sale to follow-on investors. Maximum investment is of 200.000€.

**InnovationsKapital:** another VC firm, which also originated from a Chalmers initiative. InnovationsKapital invests in more mature projects.

#### **4. Concluding Remarks and Initial Assessment**

Chalmers Innovation is already regarded as one of the most successful entrepreneurship centers in Europe. This has happened in a relatively short period of time. Nevertheless, Chalmers success has not occurred overnight. First of all, it is located in a entrepreneurial hotbed. Several hundred spin-off companies had emanated from Chalmers and Göteborg universities prior to the constitution of the Innovation center, which was to a certain extent, the culmination to longstanding effort to find the right entrepreneurship model in this region of Sweden.

Secondly, new venture creation seems to be a fully accepted technology transfer route in Sweden's universities and community. At the university level, the duties of professors are clearly established in the following order: 1/3 teaching, 1/3, research, 1/3 community service. This distribution encourages research and spin-off creation. Adding to this, Chalmers University of Technology budget is approximately 2 billion SEK per year, with over two thirds dedicated to research (140€ million)

Furthermore, Chalmers Innovation represents not only itself but also a strong network of capital and service providers as describe previously. It is difficult to communicate the importance and effectiveness that this system has. Chalmers Innovation is an active partner but also a *facilitator* giving access to other *full support models* on its own right such as Connect Väst or Venture Cup.

Another interesting concept, while clearly not exclusive to Chalmers, is the stated objective of “constructing” new companies by putting together pieces. Finding an opportunity, capital and an entrepreneurial team separately and putting it all together. In this area, Chalmers has gone as far as building a “factory of entrepreneurs” in Chalmers School of Entrepreneurship, after identifying difficulty in securing this input.

Finally, Chalmers is practice instead of theory. It strives for active involvement and supervision of spin-offs, becoming a partner and leading the implementation of a business plan. It clearly understands that creating a new company is, above all, effective implementation. Its attitude reflects this concept, being quite pragmatic and results oriented.

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# CIE & SMIL at Linköping University



Centrum för Innovation och Entreprenörskap  
Centre for Innovation and Entrepreneurship

The Centre for Innovation and Entrepreneurship (CIE) and SMIL (Business Development in Linköping) were visited on the morning of July 5<sup>th</sup> 2002. Mrs. Carina Schärberg, project manager, attended the meeting. Additional material for this report has been provided directly by CIE. Supplemental sources are listed in the bibliography.

## **5. Introduction**

The Center for Innovation and Entrepreneurship and SMIL, a Linköping business development network, share a common space at the CIE premises in Linköping University. Close cooperation of these two organizations has made them a unified front in the field of new venture creation in this region of Sweden. They have co-arranged a variety of programs and activities to promote spin-off creation around Linköping.

As stated, SMIL is actually a network, grouping the technology-based or knowledge-intensive enterprises of the region. Currently, this network is made up of approximately 160 members (See attached exhibit for full listing). The activities of CIE and SMIL, many times overlapping, are organized in the following areas:

- Networking events (for any stage of development)
- The Entrepreneurship Program (ENP) (for spin-offs)
- The Development Program (for established firms)
- Management Groups (for established firms)

In this part of Sweden, efforts in entrepreneurship have been ongoing for quite some time. In fact, the entrepreneurial support system at Linköping's University goes back to 1981. The Center for Innovation and Entrepreneurship (CIE) was founded in 1993 when many of the entrepreneurship training courses and support programs were already in place.

It is important to notice that the CIE/SMIL model is unlike traditional business support systems that only address specific requests and needs of individual spin-offs or companies. In fact, CIE and SMIL have been envisioned to help resolve problems that affect a whole community of business firms within a sector. This is especially true of the Management Groups program. Furthermore, the approach to problem solving by CIE and SMIL clearly leverages on the strengths of the network structure, as it is also a group of players that work together to find a common solution. In a way, CIE/SMIL is a business network acting in benefit of the business network. This "model" in Linköping is closely tied to the concept of regional competitive development.

Depending so decisively on a network has turned CIE/SMIL into an effective intermediary, agent or broker of new venture service suppliers. This appears to be one of the most important roles of this center.

CIE/SMIL has also organized itself in accordance to the development stage of a spin-off. It classifies projects as being in the *Idea stage*, *Start stage* and *Growth stage*. A variety of services are offered in each phase to meet the specific needs that must be addressed at that point in time.

Traditionally, the CIE/SMIL center had focused on *researching* entrepreneurship, *teaching* entrepreneurship and *promoting* the entrepreneurial culture. Spin-off business development was introduced at a later stage (1994). Consequently, an important part of what the center's offer today is still in these areas, which means that while it is devoted exclusively to entrepreneurship, it does not focalize solely on growing new companies.

Finally, while the Center for Innovation and Entrepreneurship is located in Linköping, it also gives coverage to the region of Norrköping and its university. Like Chalmers Innovation and many other entrepreneurship centers, CIE/SMIL also specializes in technology-based entrepreneurial development.

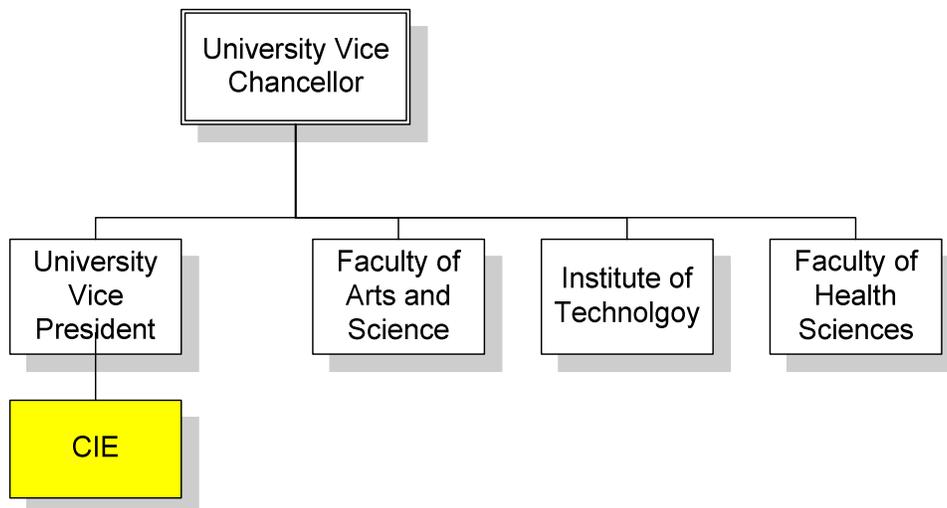
## 6. Internal Organization

CIE employs only 3 people with the following responsibilities and time dedication:

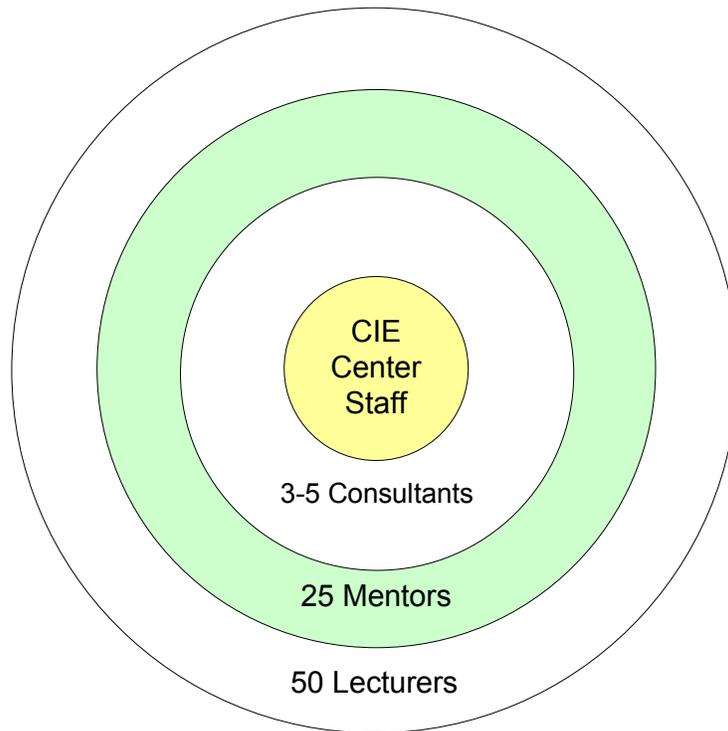
- Magnus Klofsten, Director of CIE / Part-time
- Carina Schärberg, Project Manager / Full-time
- Marianne Johansson, Administrator / Part-time

As mentioned, CIE/SMIL helps spin-offs through its extensive network of partners and support organizations. This network is made up of around 100 different individuals or organizations that surround CIE/SMIL located at the center of the network, closest to the entrepreneurs. The following graphs describe the position of the CIE within the university and the network support structure:

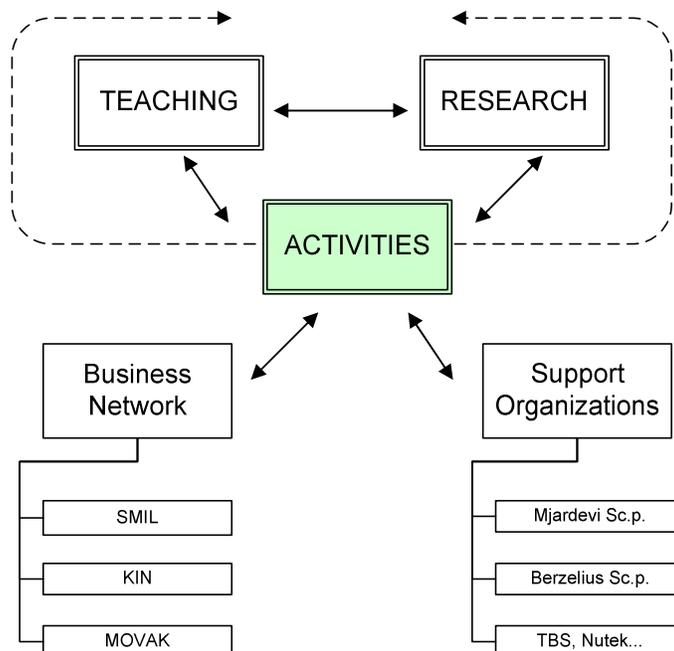
### CEI's position in Linköping University



## CIE NETWORK ORGANIZATION



The support network described above is made up of both active professionals and senior entrepreneurs paid by CIE. Outsourcing most of the support given to spin-offs allows for a very flexible system that can adjust easily to size and cost changes, like the variations implicit in the recent the boom-bust Internet experience that dramatically affected demand for entrepreneurship support. The following organizational chart puts in perspective the different activities of CIE and its network of collaborators:



Again, CIE is much more than a support unit for spin-offs. Academic research as well as transfer of entrepreneurship knowledge thought teaching and training play a major role in the center. It is worth mentioning that all the activities relating to spin-off development, such as the Entrepreneurship Program, benefit from the depth of knowledge arising from having a very active research and teaching programs.

Some of the most relevant organizations that collaborate with CIE are:

- i. SMIL
- ii. TBS
- iii. University Holding
- iv. KIN
- v. MOVAK
- vi. Venture Cup
- vii. Growlink
- viii. Pronova Science Park
- ix. Mjärdevi Science Park
- x. Berzelius Science Park
- xi. NUTEK
- xii. The Technology Bridge Foundation

## **7. Creating New Companies at Linköping University**

### **D. Promotion of the entrepreneurial culture**

As mentioned earlier, promotional efforts at CIE/SMIL have been underway for a very long period of time, dating back to the early 1980's. Therefore, the positive results achieved have not happened overnight. It is clear that the so-called "cultural transformation" towards new venture creation, in and out of the university, has already taken place and that this technology transfer route is well-known and accepted. Consequently, the promotional goal may be closer to *sustaining* the interest and information level achieved.

In any case, the facts support that the organizations within the network run a very large number of seminars, programs, networking events, lectures and training sessions. The advantages of the network structure, leveraging on the efforts of all members, is evident. CIE with only three people on staff could not reach so many individuals with such a wealth of information and activities any other way.

CIE/SMIL also tries to find the clever routes to reach potential entrepreneurs. This means sponsoring social events such as lunches or even cocktails. Additionally, CIE tries to embark key people among faculty and students, turning "believers into messengers". Achieving the support of key individuals within different departments or fields facilitates a great deal the job of promoting an entrepreneurial-friendly environment.

In relation to the large number of organizations involved and decentralization of the entrepreneurial activities, the appearance of an organization called **Growlink** is critical. Growlink's purpose is precisely to organize the activities of all public actors involved in

new venture support and promotion. As the network of actors has expanded both in number and depth of offering, it has become obvious that certain level of cooperation and synchronization was needed. This could in turn not only maximize the efficiency of the network system by diminishing duplicate efforts or allowing for the delivery of the most suitable solution in response to the specific demand of a spin-off, but most importantly, it could be used as a *entryway* or information desk in front of entrepreneurs. In the past, entrepreneurs did not fully understand where to start, whom they should contact, or at what point in time should they move on to another resource. Growlink is a coherent interface with the entrepreneur that guides and advises him or her on the proper path.

The following graph, taken from Growlink's Swedish webpage, describes the training and support activities available to entrepreneurs during the 3 stages of their project development (Idea, Start and Growth). The first stage focuses on meeting the entrepreneurs, assessing market potential and training them. The Start stage is where the Entrepreneurship Program (ENP) takes place, while on the Growth stage the Development Program and the Management Groups are run. Mentoring and incubation facilities are available from stage two and on. Networking is available throughout the whole process.



#### E. Selection of spin-off projects

The selection process at CIE is surprisingly short and simple. The only two requirements that CIE truly puts in front of potential entrepreneurs is a proven willingness to move forward with the project and stay with it on the long run (motivation) and the inventiveness of the business idea. In reference to the first variable, CIE wants to make sure that such scarce and valuable resource such as time, is sufficient on the entrepreneurs agenda to accomplish the ambitious project. This may erroneously be taken for granted and it is not always the case.

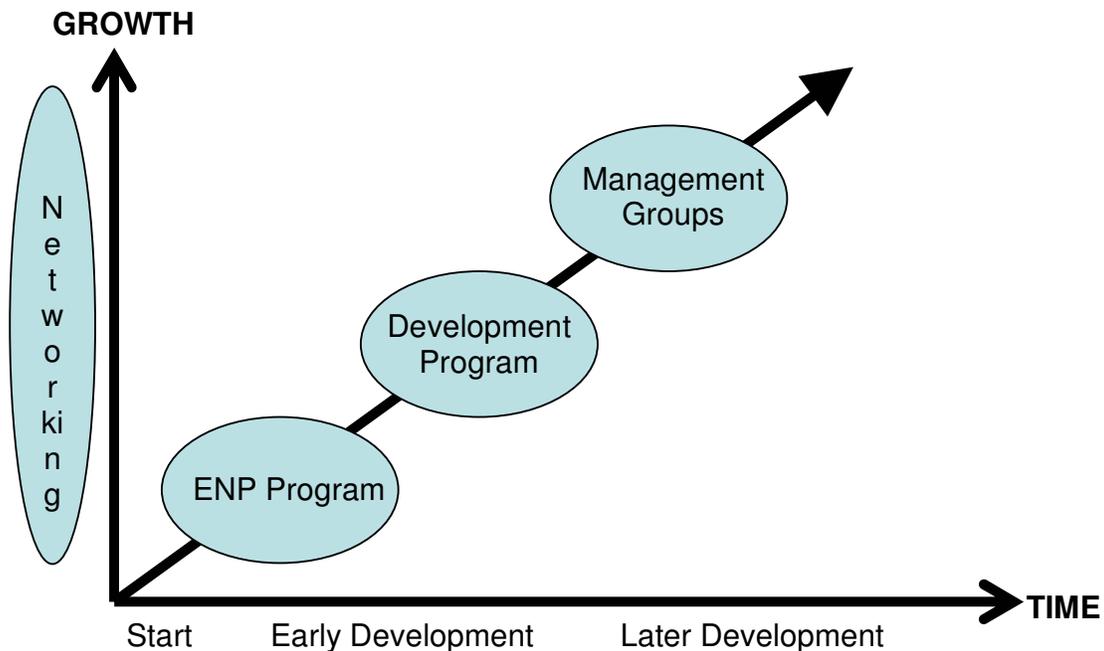
Secondly, CIE focuses on the inventiveness of the business concept. As in all entrepreneurship centers, uniqueness, innovation or knowledge intensive are some of the attributes used to describe the novelty requirement. CIE in this sense does not care if the invention is supported by cutting edge technology, high tech or low tech, as far as the application or approach is new and superior.

The selection process at CIE's University of Linköping raises an interesting issue. Their reasoning behind their decision to implement an extremely transparent and neutral selection process is their belief on the inability to judge the probability of success of a project so early on. It is the opinion of CIE's staff that evaluating a business idea at such

an early stage is near impossible. It is simply not reliable. Therefore, they don't intend to do so. While in some cases it can be argued that it is possible to predict the future success of a business concept, misjudgment may very well be as likely. Consequently, CIE's philosophy is about giving an opportunity to everybody and taking a change in a sector intrinsically risky, not only at the VC level but even more at the seed stage.

#### F. Support and management of start-ups

The CIE's support effort, composed mainly of four programs, is structured around the stage of development of a company as follows:



The Networking methodology is standard. CIE organizes four or five seminars a year with an external guest or lecturer. Also, SMIL network meetings are held monthly at one of the member company's location, where guest companies share their stories and experiences.

The Development and Management programs are directed towards later stage development of an existing company. The **Development Program** was created in 1985 and over 100 companies have been part of it. Firms are put together in groups ranging from 6-9 and a so-called 'know-how' board is established to solve an actual problem that is an issue at one of the firms. The purpose of the program is to provide an additional lawyer of support outside of the firm and allow well-established and successful firms to stay that way.

On the other hand, **Management Groups**, which originated in 1988 and has involved over 60 companies, are designed to allow companies to solve generic problems or analyze in depth issues that affect universally all companies. Topics or issues tackled can range from internalization to business negotiation techniques or quality control. The groups typically meet approximately 10 days in the course of a year.

Finally, the **Entrepreneurship Program** (ENP) is at the core of the support of spin-offs. ENP is a series of workshops through a period of 6 months designed to supply all the training and information relating to new venture creation to potential entrepreneurs. While it is a skills development program, it could also be described as a hands-holding process. The main objective of the program is to help entrepreneurs decide if they should start their own business. It is therefore a business idea assessment program. The structure of the program follows:

### **ENP PROGRAM CONTENTS:**

#### **Application**

Workshop 1: Kick-Off

Workshop 2: Business platform

Workshop 3: Business plan

#### **Tutorial 1**

Workshop 4: Practical economics

Workshop 5: Marketing & Sales

Workshop 6: Finance & Capital procurement

#### **Tutorial 2**

Workshop 7: Growth organization

Workshop 8: The legal world

#### **Tutorial 3**

Workshop 9: Conclusion, Presentation of the business plan

ENP has a clear target of producing a quality business plan by the end of the 6 month period. During the program entrepreneurs will have three tutorials where they will meet with supervisors of the program to oversee progress. ENP utilizes two supervisors; one with a finance/accounting background and another one with a business development/marketing area of expertise. A mentor will also be assigned to each project. The mentor is typically a senior entrepreneur. The workshop sessions, covering the most important issues in business development such as marketing, sales or contractual issues, are full day events. Participants will also be granted membership to the SMIL network for free for a period of one year.

After concluding the program, entrepreneurs will have the opportunity to implement their business plan in the Startup building incubator at Pronova or Mjärdevi science parks. Participation in the ENP program guarantees advantageous conditions for these entrepreneurs in these parks. The incubators initially provide a common space to work on the business plan for free for a period of three months. After this period, the spin-off can opt to move into a private office space for an additional 3 months at 150€ per month. Finally the spin-off, after formally presenting its business plan, will be allowed to stay for a period of 2 years and a rental cost of only 300€ per month plus 1.5% of the gross income generated.

A last interesting remark about the incubators is the fact that they have been able to secure a number of sponsors such as consultants that actually pay the incubator for having the opportunity to advise tenant companies. This is a win-win situation where not only the spin-off companies benefit but it represents an opportunity for the service providers to acquire new customers that can turn into important future sources of income for them.

The ENP program is quite expensive to implement. It costs around 50.000€ each and it is one of the most costly courses offered at the University of Linköping. Nevertheless, it is completely free for participants. The program is aimed at students, researchers and professors. Nevertheless, it does target students in the last two years of their PhD degree. Direct marketing such as mail box flyers or student radio and local newspaper ads are utilized to reach potential entrepreneurs. ENP is also open to anybody coming from outside the university that has a good idea. This is in line CIE's philosophy of promoting and supporting spin-offs independently of where they arise.

CIE currently organizes 3 ENP programs a year; two in Linköping and one in Norrköping. Each program assesses and develops 20 business ideas. 80% of candidates have an engineer background. 75% of participants go on to start a company (or already have a company). SMIL network companies are also welcomed in the program.

CIE does not participate in the spin-offs it helps create. There have only been 4 or 5 investments by the University through its holding company. This is quite unusual. The overall policy is to provide support in spin-off creation freely without any type of participation in exchange. CIE does nevertheless provide funding to those projects deemed economically sound by introducing venture capitalists to entrepreneurs. In fact, three risk capital firms participate in the ENP program, one of them specialized in seed financing.

## **8. Concluding Remarks and Initial Assessment**

The CIE center, in conjunction with the SMIL network, is unique in many ways. Its chosen path to support entrepreneurship in general and spin-offs in particular may not be suitable for all entrepreneurship centers. Actually, this is true in many cases as the particularities of the institution, its history, its culture and its environment exercise an influence on the structure of the entrepreneurship center. In any case it has proven extremely successful for the University of Linköping and this region of Sweden.

What appears to be a learning lesson is the capacity to provide an efficient, well-structured, and professional response to entrepreneurs and technology-based companies in a decentralized network structure. Collaboration seems to lead to cost savings and helps extend the reach of the "tentacles" of those institutions defending and promoting entrepreneurship.

The CIE and SMIL model reinforces the concept that spin-off support personnel, while specialists in spin-offs, can only be generalists in all the areas of business development, technology and financing. Therefore, the figure of the facilitator, being the link to a network of collaborators and suppliers is essential.

CIE and SMIL have also been capable of reaching very advantageous conditions from these providers of services, many of which work for reduced fees or even for free. Its non-profit mentality, as the center does not expect a direct return on its investments, poses a big question mark about what the real objective of a university-based entrepreneurship center should be (Technology transfer or commercialization of products).

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# UNIVERSITY OF GÖTEBORG



GÖTEBORGS  
UNIVERSITET

The University of Göteborg (GU) was visited on the afternoon of July 5<sup>th</sup> 2002. Mr. Claes Jansson and Nicklas Fernqvist, commercial advisors, as well as Peter Johansson and Sara Olsson, legal advisors, attended the meeting. Additional material for this report has been provided directly by the University of Göteborg. Supplemental sources are listed in the bibliography.

## **9. Introduction**

The University of Göteborg (GU) is Sweden's second largest university. It is a strong research institution, especially in the fields of medicine, odontology and marine science. The university, known as the 'university in the city' for its privileged location at the city center of Göteborg, is home to 39.000 undergraduate students, 3.700 postgraduate students, 2.600 teaching staff/researchers and 2.100 active research students

GU's research centers are, to a large extent, sponsored with industry contracts. The **Sahlgrenska Academy**, embodying the faculties of Health Caring Sciences, Medicine and Odontology, with a staff of 1.600, may be GU's highest exponent of excellence in research. The Sahlgrenska Academy has been quite successful in developing pharmaceuticals or other medical products. This research academy is clearly orientated towards the private sector and maintaining corporate relations.

Commercialization of research is typically channeled through the **GU holding** company. A total of 12 projects have been formed during its 5 year existence. GU holding is on its own right an umbrella of highly specialized companies centered in the area of medical development support. Additionally, there are two other organizations that play an important role in the area of spin-off promotion. The **6<sup>th</sup> AP fund** (a state pension fund that invests in growing new and small Swedish business initiatives) participates in the development of patents and the exploitation of medical research findings at GU. Finally, the **Technology Link Foundation** of Göteborg is another significant innovation partner.

The Innovation and Commercial services office is the administrative center at the University of Göteborg in charge of spin-off support. Having mentioned a number of spin-off support organizations prior to introducing the internal technology transfer office is no coincidence. It is due to the fact that the duties and objectives of this office, and consequently the work being done in it, are not focused in accompanying entrepreneurs *throughout* the creation and development of their new companies. The duties and objectives of this office end sooner and are designed to respond only to early development needs of the entrepreneurs at GU.

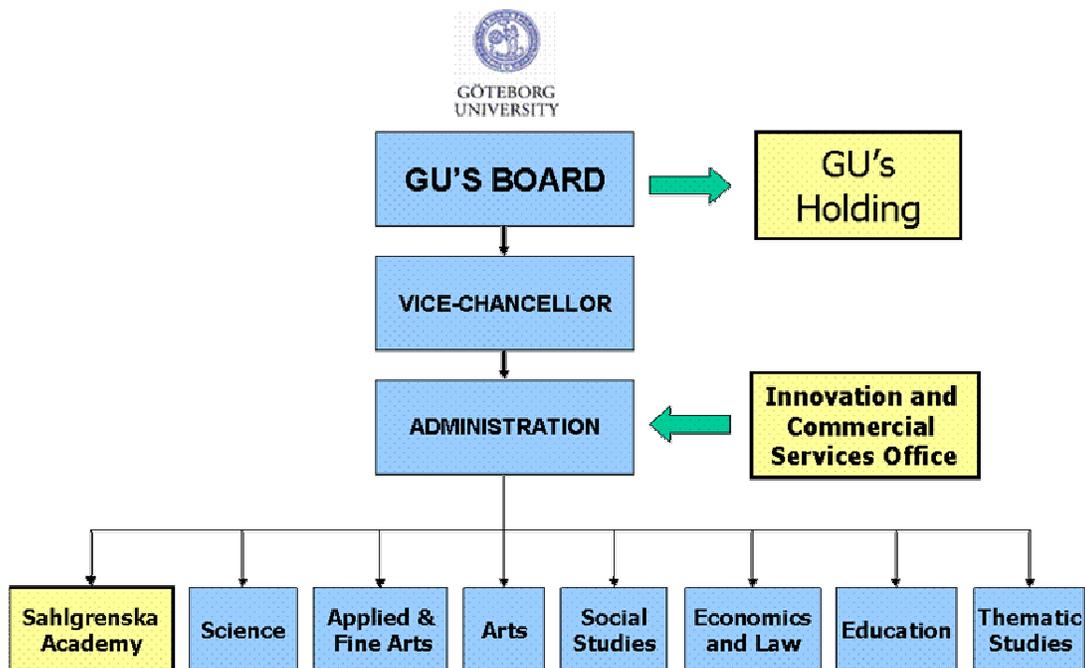
The office is limited in the range of activities (and the depth of these ones) it can perform in the field of spin-off support. These limitations arise from a variety of factors such as internal policy or legal matters. Independently of its origin, the support it can offer to entrepreneurs is restricted.

## 10. Internal Organization

The Innovation and Commercial services office employs four people that that give support to spin-offs:

- Claes Jansson, Commercial Advisor
- Nicklas Fernqvist, Commercial Advisor
- Peter Johansson, Legal Advisor
- Sara Olsson, Legal Advisor

The three main organizations in GU involved in the area of spin-off support are highlighted in yellow in the following organizational chart.



## 11. Creating New Companies at the University of Göteborg

As mentioned, the services that the Innovation and Commercialization office can offer are limited. In general, its advisors help researchers and students during the early stage development of their business concept. The office normally interacts with potential entrepreneurs during 3 to 5 orientation meetings. This time frame is considered the borderline between the support services that the office is obliged and expected to deliver to university personnel and what could be considered excessive help to a future private enterprise in relation to unfair competition law. The office is also accountable for the allocation of valuable internal resources to the development of private projects. Therefore, in a sense the self-imposed limitation may respond to an internal view of lack of responsibility towards supporting spin-off initiatives beyond a certain stage. As

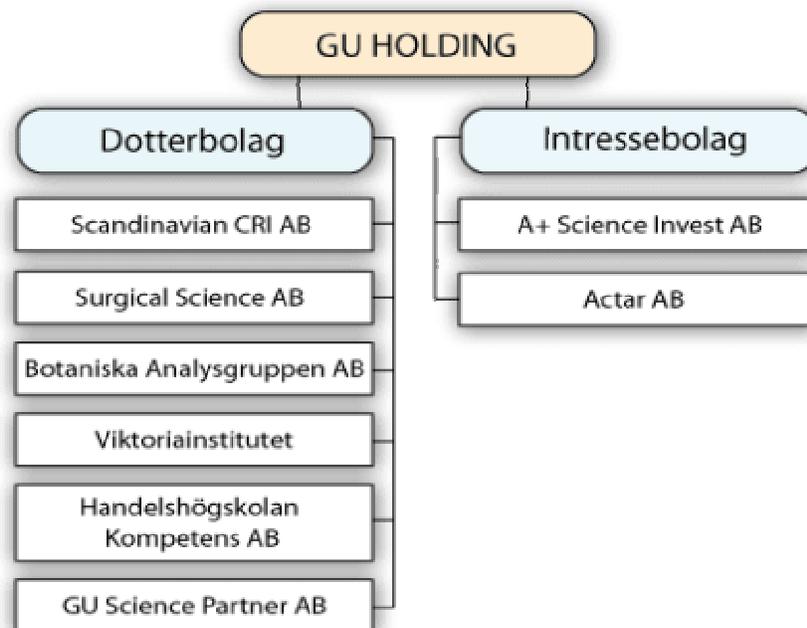
a consequence, an important part of the spin-off support structure is outsourced and remains outside GU borders.

The services the office of Innovation and Commercial services advises on are not unlike the ones of any other TTO. They include:

- Business development
- Commercial networks
- Financing
- Commercial law
- Intellectual property rights

GU does not assign coaches or project managers to spin-off projects. Typically, around 50 inquiries are made annually to assess the viability or necessity of forming an independent company. The Innovation and Commercialization office responds to all inquiries with no regard to the type of project. The field or novelty level of the project is not a selection criterion.

The University of Göteborg does not invest in spin-off projects. Investments are exclusive of its GU Holding. This organization plays a major role in spin-off activity at GU and is a good example because it exemplifies the approach to technology transfer that the university has chosen. The organizational chart of GU Holding follows:



*\* Left hand side companies are subsidiaries while right hand side companies are participated.*

Simply put, GU Holding is a conglomerate of mostly medical spin-offs originating from the labs of the university. Most of them arise from highly active research groups or institutes that, having being quite successful in contracting with the private sector, have gone on to become enterprises of their own offering their research and development services to the pharmaceutical industry. The companies of the GU Holding offer clinical

trials (Scandinavian CRI and GU SciencePartner), digital training simulators for medical professionals (SurgicalScience), research & product development in the IT field (Victoria Institute) or medical inventions commercialization services (A+Science and Actar). There are other fields and other companies but it is both clear and interesting to realize that GU Holding's strength is in responding to the medical sector needs of training and R&D. GU invests and help professionalize those organizations within GU that have a high potential in delivering value-adding services to this industry.

Therefore, an initial conclusion would be that GU focuses on spin-off development that arises most naturally within a university environment (professionalization of the commercial contracting activity) and it does so by exploiting the areas in which the university is know for excellence in research. This is a lesson in plain common sense. Also, the fact that GU Holding focuses almost exclusively in one sector makes it an expert in assessing the commercial viability of ventures in the medical field.

What is surprising is that GU holding has realized that the university has gathered significant experience in directing applied research, assessing it and giving shape to service and products arising from it. Therefore, two of its spin-offs offer just that. A+Science and Actar can manage, partially or totally the route to the market for the ongoing research projects of pharmaceutical companies. We found the concept of "selling" the sector-specialized model for spin-off/new product generation quite interesting. Are these companies following on the steps of the established BTG's?

Going back to the role of the Innovation and Commercial Services office, its promotional effort ranges from open business advice to publishing a newsletter and organizing seminars. Additionally, Venture Cup, a business plan competition offered throughout Scandinavia, is also publicized. Finally, the office tries to channel potential entrepreneurs towards the University of Economics where a one year program in new venture creation is being offered. Participating students commit to starting a new business at the end of the program. Facilities for incubation can be arranged at office staff.

Lastly, the office tries to focus on defining the participation of the entrepreneurs (both in terms of dedication and ownership) and complementing entrepreneurial teams. This can have major direct positive impact in the future success of the spin-off and it can be done early-on and with limited resources.

## **12. Concluding Remarks and Initial Assessment**

Entrepreneurship and support for spin-offs at the University of Göteborg is both traditional and unique at the same time. While, the internal resources that the university devotes to this field are small (in line with universities with a historically traditional view of the field), the subsequent network of actors that has appeared seems adequate and personalized to the specific needs of the university members. GU Holding is a lesson for maximizing the benefits of university contracting and the benefits of specialization. The Sahlgrenska Academy is an additional example the importance of investing on what you do best and developing some sort of know-how comparative advantage that will lead to commercialization opportunities.

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# UNIVERSITY OF NEWCASTLE upon TYNE



The University of Newcastle (UN) was visited on the afternoon of July 18<sup>th</sup> 2002. Mr. Phillip Harley, Business Development Manager attended the meeting. Additional material for this report has been provided directly by the University of Newcastle. Supplemental sources are listed in the bibliography.

## **13. Introduction**

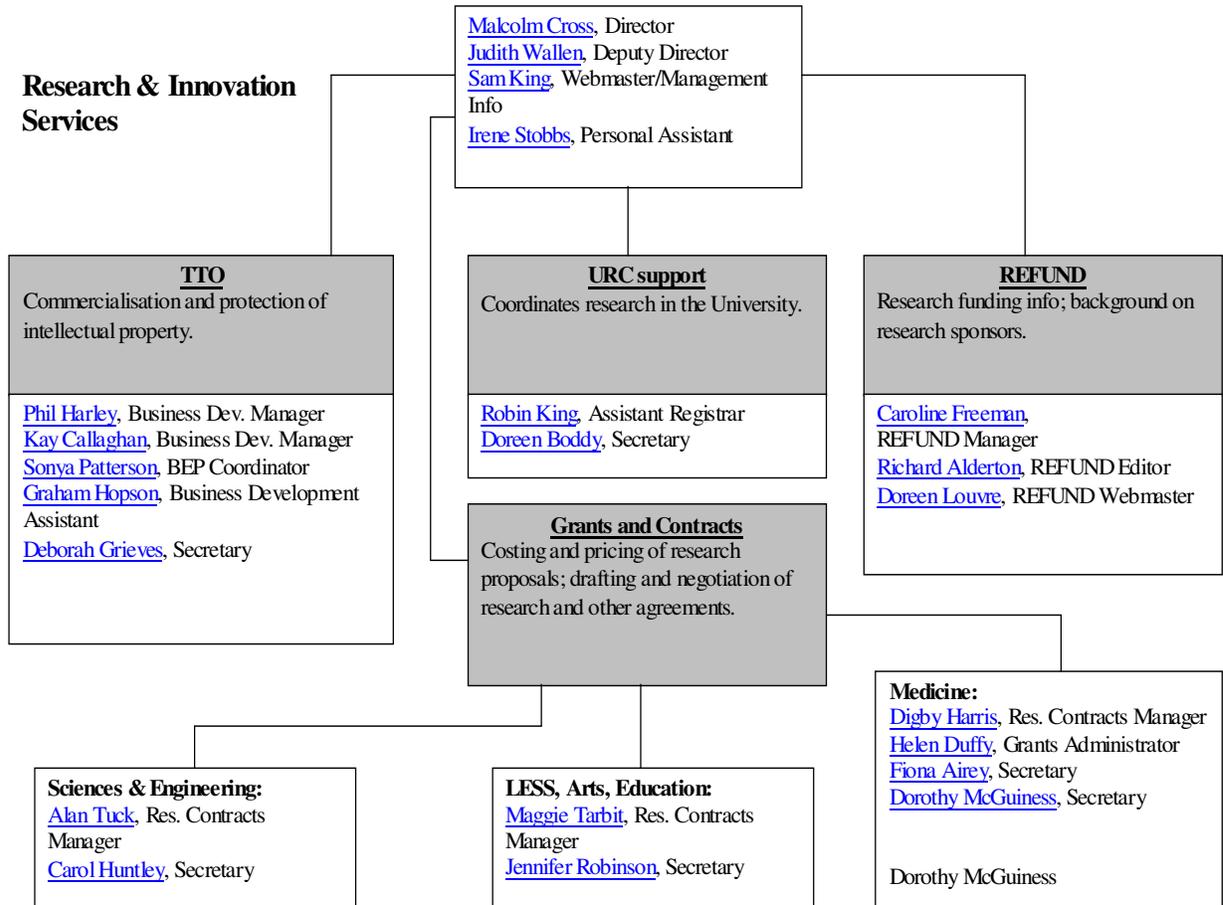
The University of Newcastle originated from the School of Medicine and Surgery created in 1834. Today the university has more than 70 departments organized in 7 faculties: Medicine, Engineering, Sciences, Agriculture & Biology, Law, Environment & Social Sciences, Education and Arts. The university is home to 15.000 students and 4.300 staff members, of which 2.600 are professors. In 2001, the university secured through external resources (research grants and contracts) 45 million Pounds (71€ million).

As the name implies, the Research & Innovation Services office (RIS) manages the university services in relation to innovation. The services that RIS offers are mostly centered on R&D financing, that is, supporting the application process for research grants and bidding for commercial contracts. RIS therefore operates like a Technology Transfer Office. In fact, the RIS structure includes a TTO within its organizational diagram. RIS also helps members of the university community develop business opportunities. Nevertheless, the administration of research captures most of the efforts and resources of the office.

## **14. Internal Organization**

Within RIS, the TTO is the unit responsible for the commercialization efforts of research results. This office, created in 1995, is currently staffed with two Business Development Managers, one focusing on the life sciences and the other on the physics-based sciences.

The following organizational diagram provides more information on the structure of RIS:



Like many other universities, Newcastle has created a 100%-owned subsidiary, **Nuventures** (Newcastle University Ventures Limited), to support those projects in the technological field that could involve commercial transactions (such as patent licensing contracts or income arising from royalty payments). These would interfere with the non-profit status of the university and therefore demand that they are managed through an independent legal entity such as Nuventures. In short, the role of Nuventures is to be the Intellectual Property (IP) *custodian* of the university. To avoid the potential refusal by researchers of an external company, the TTO acts as an intermediary between researchers and Nuventures. Furthermore, the expertise in intellectual property does reside within the TTO. In fact, Nuventures can be considered an empty entity.

In biotechnology, the TTO coordinates the university's involvement in a company called **Bioscience Partnership** (BPL). The goal of this participation is to promote biotechnology transfer into the marketplace. BPL is a collaboration of the University of Newcastle, the Babraham Institute and the University of East Anglia. The company was founded following the guidelines of the Biotechnology Exploitation Platform (BEP) Challenge.

Recently, the university has created a **Business Development Team** to further strengthen the relationship with the private sector. Its goal is to attain a better understanding of the needs of different industries. The four managers of the Business Development Team are specialized by sectors: biotechnology & pharmaceuticals, agriculture, marine & food sciences, engineering & offshore industries, and finally, information technology & informatics. Based on the information gathered, the team managers match identified industry needs with university expertise. The Business Development Team is part of the government initiative **HEROBC** (Higher Education Reach Out to Business and the Community), which in turn is coordinated by the **Regional Development Office** (RDO). This office promotes interaction between the university community and society as a whole. It facilitates contacts, identifying knowledge areas and providing information about the university. This office is part of the Regional Development Strategy by the government to improve economic performance and enhance a region's competitiveness. Right now, the University of Newcastle is studying the possibility of merging the TTO and the RDO given that its objectives and duties overlap quite a bit.

More recently, in 2002, a so-called **Equity Committee** has been created as the formal entity in charge of authorizing the creation of university spin-offs and to define the stake that the University of Newcastle will take on these new enterprises.

Another important institution in the field of technology transfer is the **Knowledge House** (KH), a partnership of five northern universities to provide a single, common and coherent interface with enterprises in helping them identify solutions and help to their problems within the university system. The Knowledge House focuses on servicing small and medium sized businesses. It operates like a consultancy providing half a day for free. The cost of the service, from that point, on also benefits from a 50% government subsidy.

Finally, the University of Newcastle is a partner in a venture capital fund, also in conjunction with other universities. Currently, the activity level of this fund is quite low. The northern region where the University of Newcastle is located does nevertheless have a business angels association promoted by **Investors Forum** (Entrust), a non profit organization that supports business development.

At UN, a missing piece within the support structure to spin-offs is an incubator. The University of Newcastle does not currently have a dedicated facility for this purpose. To address this problem, the university has put forward a memorandum of understanding to allow use of its facilities to run a business. Terms are generous. Most facilities are available after 5 PM.

## **15. Creating New Companies at the University of Newcastle**

### **G. Promotion of the entrepreneurial culture**

While the university does not have a set agenda of events to promote the entrepreneurial culture, there are a series of activities aimed at this. Over the years, entrepreneurship has gained notoriety for being a major driving force in economic development. This has had an internal effect on how providing self-employment opportunities to graduates is

viewed. In the past, most graduate students at the university left the region after completing their studies. In recent years there has been an effort to try to reverse this demographic trend and provide opportunities locally. Adding to this, with the arrival of the new vice-chancellor, a push in spin-off creation has been made. Spin-offs are viewed as a new way to reach out into the community, which is an important university objective. Five spin-off projects are currently being managed and the goal is to generate 12 new ventures a year.

Furthermore, the university believes that spin-offs *sustained on a patent* are the most effective way of promoting, and therefore reaching commercial success, of a patent investment. The inventor is deemed the ideal individual to market the innovation as he or she will be most enthusiastic and knowledgeable about the technology. In other words, choosing the spin-off route guarantees a higher commitment from the researcher and therefore a higher rate of commercial success than just patenting and hoping to find a buyer or licensor.

Word of mouth is also an effective means of promotion. Talks with faculty and research students are held regularly. Entrepreneurship is also being introduced in the academic curriculum. For example, the 'IPR and Entrepreneurship' module part of the MRes in responsive processing, introduces graduate students to the commercialization and protection of their research results.

Finally, the **Careers Service Office** also promotes self-employment among students as a viable option at the end of their studies. This office regularly channels information on entrepreneurship such as details of events and courses to those individuals interested in the subject.

#### H. Selection of spin-off projects

As mentioned, spin-off selection is now formally handled by the Equity Committee. Nevertheless, the selection process begins at the TTO level where the first order of duty is to resolve any IP issues. Afterwards, the office tries to complement the management team with a CEO. This is considered a priority in response to the typical investigator profile: someone with low risk tolerance, and possibly, a lack of time or drive for a long-term commitment to a project like starting a new business. The TTO likes to further strengthen the project with a non-executive director, usually an experienced retired senior. Finally, the other essential variable is identifying a potential source of financing. Having covered such issues, the Equity Committee is likely to assess favorably the proposal.

Once a proposal has been approved by the Equity Committee, the university transfers the IP to the new company in exchange for an ownership stake. The university tries to obtain an equal distribution of 1/3 to the researchers, 1/3 to the university and 1/3 to the venture capitalists. This is just a starting point figure that is adjusted on a case-to-case basis. Usually, the VC firm secures a higher stake in detriment of the university. In relation to the patent policy, priority is given to the researcher, who will control 40% to 100% of the income generated by a patent. When the university utilizes the IP rights to invest in a spin-off, income from this stake is exclusive of the university. The university only exchanges IP rights for ownership; it does not put cash into spin-offs.

## I. Support and management of start-ups

The Technology Transfer Office helps researchers at the University of Newcastle from three different points of view: managing technology transfer projects, patent licensing agreements with external institutions and spin-off creation arising from research results. In short, the services that the TTO offers are the following:

- advice on intellectual property for valuable ideas and expertise
- assessment of commercial potential
- help seeking appropriate legal protection
- contacts with potential commercial partners
- negotiation of a commercial contract
- project management assistance
- advice on licenses, royalties and commercial opportunities

Usually the first contact with the researcher and the TTO is made through the commercial contract staff of RIS, which inform him or her about the procedures to follow. In the first stage, the researcher notifies of his or her invention filling an Invention Record Questionnaire. Based on the academic field of origin, a Business Manager is assigned and analyzes the proposal. This person tries to identify the best route to the market, that being a license or a spin-off. In this matter, it may be worth mentioning that the opinion of the investigators about what “shape” the project should take tends to impose itself as the investigators are the ones who truly control the know-how and their collaboration is therefore essential. If a license is selected, then the manager looks for a company to license it to. If the path chosen is a spin-off, the professor will have to prepare a “Business Case Template” for submission to the Equity Committee. This document is quite similar to a business plan but it also takes into account ethical issues, conflicts of interest, potential university liability and the strategic significance of the investment to the university. If the Equity Committee decides not to invest in the project, IP is then given back to the researcher if he or she wishes to move forward.

The university does not provide support in writing a business plan or the Business Case Template. There are a variety of organizations that provide help in this area. The **Regional Technology Center (RCT)**, a member of the European network of Innovation Relay Centers, is one of them. This organization centers its activity in providing market research. In any case, access to this service remains difficult as one of the requirements is that the company has been created. This is not possible until the university has granted an authorization. Another local agency organizes **Graduates into Business**, which offers postgraduates business skills training and help preparing a business plan.

The spin-off support activities at the University of Newcastle have resulted into the creation of the following 27 new companies: EVER 1391 Ltd, ERS Consulting, Xcellsyz, Protensive, Bioscience Partnership, Arjuna Solutions, Arrow Therapeutics, North East Micro-Electronics, EDEC Multimedia, Northgene, Genotype, Nuwater Consulting, Tree Roots Investigation, Selective Antibodies, Building Design Software, The MARI Group, BatchCAD, Novacastra Laboratories, North of England Arable Farm Centre, Trends Business Research, Shipboard Infomatics, Seabait, Environmental Technology Consultants, Fairs plc, Integrated Display Systems, Claremont Controls,

Soil Machine Dynamics. This list reflects activity for the period starting in 1970 until 2001.

From the previous list, a particularly interesting example for Catalonia is **Xcellsyz**, an Anglo-Spanish biotechnology company founded in July 2000. Xcellsyz is “developing cell based platform technologies that will be of great utility in the drug development and discovery processes. Value will be derived from the fact these systems will speed up these processes and allow identification and validation of drug candidates and novel drug targets that would not be identified using traditional methods. The potential value of this approach is demonstrated by the fact that Xcellsyz has already made several significant deals to license its technology to major pharmaceutical companies including Glaxo SmithKline and Novo-Nordisk.”

The company is based on research from a number of professors and institutions, Prof. Antonio Zorzano of University of Barcelona being one of them. The company is also participated by Barcelona Empren.

## **16. Concluding Remarks and Initial Assessment**

While the operation of the Research and Innovation Services office is quite straight forward, it does have a few particularities.

First of all, most noticeably is the philosophy of technology transfer above everything else. The University of Newcastle does not have strict goals or objectives about spin-off creation. Its efforts are all pointing towards a coherent strategy of knowledge transfer into the community. This is the overall objective. Spin-offs are just an additional means of achieving this objective and helping in the overall regional strategy of economic development. The positive side to this is that spin-off activity is strongly tied to a major university goal and its overall strategy. The downside may be that the spin-off initiative many not have enough weight on its own. It may also suffer from a lack of an independent long-term development plan with tangible objectives.

It is also worth mentioning the high degree of internal collaboration within the different lines of technology transfer. Information obtained from researchers through contacts maintained for contract administration is valuable for patents and spin-offs. While obvious, collaboration is not always present in many technology transfer units.

Another lesson from Newcastle may be its focus on professionalizing the founding team of a new venture. Also, in relation to founding teams, the University of Newcastle puts highly values its ability to interact effectively with researchers and making them interested in applicable research and technology transfer, on their own terms. The human interaction with researchers is clearly a key success factor that can be managed.

Finally, it may be interesting to further analyze if the effect of having a number of independent units, departments or institutions providing the same services and doing the same job (such as the TTO and the RDO, or the Business Development Team and the Knowledge House) is beneficial, cost effective and how is this collaboration being managed.

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# LEEDS INNOVATION



## Leeds Innovations

**Leeds Innovations** (LI) was visited on the morning of July 19<sup>th</sup> 2002. Mr. Peter J. Rawlings, Managing Director, attended the meeting. Additional material for this report has been provided directly by Leeds Innovations. Supplemental sources are listed in the bibliography.

### **17. Introduction**

**The University of Leeds** (UL) was founded in 1904 even though its origins date back to 1831 with the Leeds School of Medicine and 1874 with the Yorkshire College of Science. This initial specialization is still apparent today with the Department of Healthcare Studies being the biggest of the institution with 2.200 students.

The University has a total of 28.000 students and a staff of 6.700, of which 3.000 are involved in research. In this field, the University of Leeds is ranked seventh in the nation with an annual income of over £60 million. There are a total of 35 departments rated excellent in research. In the field of innovation and technology transfer, Leeds was the first University in the country to create an independent company in charge of managing and promoting research results. Today this company is Leeds Innovations. UL also pioneered in collaborating with an external investment company to finance the commercialization process of research results (**The Forward Group**, a venture capitalist). Additionally, under the challenge fund structure, Leeds in conjunction with Sheffield and York has obtained £4.5 million for its own venture capital fund, the highest amount awarded to a single fund. This amount has been increased to £9 million with a £3 million investment from the **Yorkshire Forward** (an organization promoting the economic development in this region) and £1.5 million of additional funds provided directly by the universities.

Leeds Innovations is 100% owned by the University of Leeds. It defines itself as an innovation incubator. Utilizing this definition, the company wants to communicate its focus on commercially promising research and its role of taking it into the market place as a product or service. Leeds Innovations has helped create over 40 new companies

where it participates as a shareholder. Two of them have a US subsidiary. It has raised £17 million for 15 of its spin-offs alone and has reached 23 licensing agreements for its patent portfolio. Right now, Leeds Innovations' objectives are the following:: detecting 100 opportunities, achieving 20 licenses and creating 10 new spin-offs per year. It plans on being self-sufficient economically in 3 years (taking into account all of its activities). Leeds Innovations believes a minimum of five years are needed to achieve this goal if the project is just starting out.

Leeds Innovations' Managing Director believes it is possible to view the commercialization efforts of a university structure in two ways. Firstly, having a service orientation in which the structure is a tool at the disposal of investigators. In this case, results are not as important. Consequently, nor is the selection process of projects. With such a philosophy, many projects that may be inadequate for a variety of reasons (such as insufficient market size) are accepted. On the other hand, a University can decide to implement a commercialization policy based exclusively on business criteria.

Clearly, most TTO structures are closer to the first model than the second one. To the contrary, LI's vision is much closer to the second model than the first one. Leeds Innovations is very much business-oriented, having its own strategy laid-out on its own business plan.

In general, Leeds Innovations views its activity twofold. Initially, it focuses on business development, which involves identification of projects, selection, support and developing those commercially viable initiatives. Secondly, LI must manage its investment portfolio. It supervises activity and looks for an exit window that maximizes return. The personnel and activities that these two separate stages demand are quite different.

## **18. Internal Organization**

Leeds Innovations is structured by divisions. There are a total of seven divisions. Some respond to operational organization and some are simply inherited spin-off projects that have become part of LI (temporarily).

- 1) **The Business Development Division** duty is to commercialize research results.
- 2) **The Consultancy Division** manages the contractual activity arising from the consulting practice of professors. The range of services is wide; materials testing, labs tests, accuracy tests, field studies, expert assessment, etc. Leeds Innovations typically adds a commission ranging from 10% to 15% as a management fee.
- 3) **The License and Royalties Division**, focusing on generating an income stream from patents.
- 4) **The Rock Deformation Research Group (RDR)** is a "team of geoscientists that are international leaders in the analysis of the impact of faulting on the fluid flow in hydrocarbon reservoirs and mineral deposits. Working with the major oil and mining companies, they are continually developing and applying new techniques to assist in field appraisal, development, and exploitation."
- 5) **The Valve & Seal Testing Centre** offers manufacturers and user expertise in valve systems. Products can be tested in extreme conditions. Deficient valves are also a common target of analysis.

- 6) **The Centre for Industrial Polymers** works with fibers, composite materials and polymers for a variety of applications.
- 7) **The Multimedia Division** helps university departments, commercial organizations and individuals commercialize innovative software and media solutions. It advises on how to commercialize software, market and sell computer products.

As mentioned, the last four divisions can be considered a consequence of past management decisions. In reality, a company of this kind should only focus on the first three divisions, which is where its core practice is centered. It is plausible that Leeds Innovations decides to divest some of its non-core activities in the short term.

Leeds Innovations does also need to collaborate with a number of external organizations in bringing forward spin-off projects. LI works closely with the **Research Support Unit (RSU)**, which is in charge of managing research at Leeds University. The RSU informs investigators of the different research financing sources, manages these funds and centralizes all information relating to research. This unit is also in charge of protecting intellectual property. A unique characteristic of the so-called Leeds model is its focus on identifying projects at a very early stage. This is true both at LI and at the University level.

Another important organization is the **White Rose Consortium**. It is an association between the universities of Leeds, Sheffield and York, and supported by the government, to provide support and promotion of entrepreneurship. The consortium has the following lines of work:

- i. **The White Rose Technology Seedcorn Fund**, has £6 million to finance projects arising within the three universities. It is part of the University Challenge structure mentioned earlier. This fund invests up to £250,000 in each project in exchange for a stake in the new company, typically 20-40%. All profits are reinvested into the fund. Therefore, there is no intention to generate profits (that is, outside the fund).
- 2) **The White Rose Centre for Enterprise**, resulting from a grant of the DTI to promote and develop business activities on campus, and especially at the Engineering and Science faculties of the universities.
- 3) **The White Rose Faraday Packaging Partnership**, also created with the support of the DTI to promote the collaboration of these universities in the field of packaging.
- 4) **The White Rose Biotechnology Consortium**, funded by the Biotechnology Exploitation Platform and the DTI to incentivate technology transfer in biotechnology.

A final mention must be made to the Forward Group, an important venture capitalist that has created a £20 million fund to finance spin-offs requiring a significant investment to take off. In short, this fund is the financial vehicle for those projects that require funds in excess of £250,000. The Forward Group fund also provides consulting and management skills to the spin-offs. They maintain a relatively high level of involvement with the projects they support. This allows investigators to center on their core competencies. The Forward Group fund makes large investments but expects a large participation in the new company (70%).

## **19. Creating New Companies at Leeds Innovations**

### **J. Promotion of the entrepreneurial culture**

Leeds Innovations is quite active in the field of promotion of spin-off initiatives. It organizes presentations, seminars, business plan competitions, etc. Nevertheless, the best promotional system is LI's staff. The five Business Development Managers are very close to the investigators and develop close relationships with the departments and fields they cover and give service to. Additionally, there are two other aspects that must be taken into account. First, according to LI today's investigators do not oppose commercialization. The internal university culture has changed a lot and now researchers understand the value of their research and are used to the commercialization process. Secondly, the University of Leeds has a budget of over £60 million in research, which means that many opportunities must be readily available and should arise naturally. These two points clearly facilitate the process.

LI tries to focus its attention on the institution's best researchers (as you would at any other place). What is different in Leeds Innovations strategy is that it does not take into account students, both graduate and undergraduate. This is bit of an exception compared to many other centers where the "recruitment" of future PhD's is highly sought after. This is due to the fact that in the UK, rights over undergraduate students' research results do not belong to the institution. The case for PhD students is not clearly defined by the legal system. This is another example of the business orientation of LI.

Finally, Leeds Innovations tries to collaborate with external institutions that can generate deals, such as hospitals.

### **K. Selection of spin-off projects**

As in most centers, there is not a clear selection criteria established. Nevertheless, like in every other place the same variables (market, team, technology, etc.) are assessed. Additionally, as mentioned Leeds Innovations is run (and sees itself) like a private company with a clear objective of engrossing its bottom line. Therefore, anything that does not fit in this framework is not considered.

In terms of the selection process, it is very well defined. This process appears to be a very stringent filter, demanding three approvals at different stages of development. In order to attain the support of Leeds Innovations, an initiative must undergo through two internal evaluation commissions with LI's staff and one final external evaluation in front of LI's board and the Committee on University Companies. The process is further described in the following section.

### **L. Support and management of start-ups**

In line with most commercialization companies in the UK, Leeds Innovations bases its model on the figure of the Business Development Manager (or project manager). The profile of these individuals is typically one of a Doctor (capacity to understand Science) complemented with an MBA. This person must have industry experience and an

understanding for the commercialization process of research. Right now LI has 5 business development managers which cover five different fields of expertise. They all share a very proactive attitude. For example, they are in charge of writing the business plan for the new company. In fact, they will act as CEO's of the project during early development. Business development managers typically drop the project once professional management steps in.

In reference to professional management, it is not easy to find qualified and willing individuals for this role. The search is made through LI's network of contacts and collaborators. Mr. Rawlings, given its past professional experience as a turnaround manager, can offer a vast number of sources to inquire. Mr. Rawlings does still devote one day a week to this activity. Additionally, many CV's are received showing interest in managing entrepreneurial projects. Nevertheless, identifying the right individuals is not easy.

Essentially, Leeds Innovations follows a 7 step process in commercializing research. Entrepreneurs must do the following:

- i. **Contact with Leeds Innovations** to discover if their ideas are commercially viable.
- ii. **Write an initial opportunity description**, in conjunction with a business development manager, to submit an idea to an appraisal group.
- iii. Pass the **Opportunities appraisal group (OAG)** gate one level. The selection committee made up of LI staff and venture capitalists decides if the initiative is worth commercializing.
- iv. **Produce a Business Plan** that will include a full market evaluation and examination of different exploitation scenarios.
- v. Do a **Business Plan evaluation** by presenting it again to the OAG. At gate two, the committee tries to decide the route to the market (license vs. spin-off) and finds financing for the project, if needed at this stage.
- vi. A **Business Plan presentation** is made to the Leeds Innovations Board and to the Committee on University Companies (CUC). Their agreement is necessary to form a company or establish a large licensing agreement.
- vii. **New Company formed.**

The Business Development Division, which manages spin-off activity, is currently made up by five business development managers. There are also a legal department and a finance & administration department that runs an accounting and financial practice targeting the same spin-offs LI helps to build. Finally, the investment department is responsible for supporting those companies that are already in operation, safeguarding LI's investments. This department also represents Leeds Innovation on the company boards.

In relation to the investment management department, it may be worth exploring a bit further its operations as this area is seldomly talked about or explored by entrepreneurship centers. Leeds Innovation manages a portfolio of more than 40 investments (50% of which are subsidiaries). Therefore, the workload, while different, may be comparable to the one of a small sized mutual fund. The Director of Investments has several objectives. In one hand, he or she must supervise the activities of the spin-offs to make sure the contractual agreements with LI are met. Secondly, this person

must try to keep these young companies out of trouble, being an advisor to them on strategic matters and how to move forward. The ultimate goal in this sense is timing an exit to maximize profit. Finally, as a fund manager he or she must follow a set of portfolio balancing practices to diversify risk. In some cases, the person may go as far as to oppose to a potential investment that would load the portfolio of an unproportionately high risk in a specific area. In short, it is a complex job. Additionally, as an entrepreneurship center this experience makes you think about the implications (overhead structure costs) of maintaining an investment portfolio of spin-offs.

In reference to the size of LI's investments, the company typically looks to secure a majority stake in the new company, LI taking 60% and the researchers 40%. Half of LI's share is in exchange for the transfer of IP to the new company and the other half is justified with the services rendered throughout the development of the project.

As far as incubation space, Leeds Innovations is located at the **Leeds Innovation Centre**, which is actually an incubator promoted by the University of Leeds but participated by the facility builder. In this way, Leeds Innovations secures space for its spin-offs on its premises but does not have to manage the incubator, which they do not consider a core competence. It seems as a good win-win arrangement for everybody. The Leeds Innovation Centre Incubator is home to start-ups coming from outside of the university environment as well. While the incubator does offer a number of limited services for these start-ups (as they don't have access to the support of LI), management believes that the core value that they provide is affordable and flexible space. This particular experience adds to the evidence showing that incubation is closer to the real estate business than to new venture creation. Rates at the Leeds Innovation Centre Incubator are currently at £32 per square foot. The facility is 30.000 square feet, of which 24.000 are currently rented.

## **20. Concluding Remarks and Initial Assessment**

In our view, the experience of Leeds Innovations is valuable because it is a bit different from the one of the other centers visited. It appears to be more independently minded and focused. Leeds Innovations is truly an investment company; a company that views commercialization exclusively under the prism of economic value creation. In our opinion, this is good as it impregnates the structure with an attitude of professionalism and goal-orientation. One may argue that an entrepreneurship center should look for profitability as an essential objective in its strategy, if only because reaching this objective will guarantee the survival of the projects that it has contributed in bringing to the market. Consequently, this implies that less chrematistic aspirations (such as technology transfer for the good of society as a whole) will also be met.

Aside from this, the other elements that caught our attention at Leeds Innovations are:

- Structure based on the figure of the Business Development Manager
- Leeds has built two investment societies to provide financing for its projects
- LI focuses on identifying very early stage opportunities
- High participation policy in new companies (responding to its business orientation)

- LI is experiencing a dramatic change in the past 2 years under aggressive new management to focus on results (LI is actually over 30 years old). There is the so-called “champion” manager that propels the company forward.

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# UMIST Ventures Limited

**UVL**



The University of Manchester Science and Technology (UMIST) Ventures Limited was visited on the afternoon of July 19<sup>th</sup> 2002. Mrs. Clare Arkwright, Technology Transfer Manager, attended the meeting. Additional material for this report has been provided directly by the UMIST Ventures. Supplemental sources are listed in the bibliography.

## 21. Introduction

The University of Manchester Science and Technology (UMIST) is home to approximately 6000 students (1500 postgraduate), 500 academics and 300 researcher assistants. It was founded back in 1824 by local industrialists. It is for this reason that UMIST has always maintained a focus on business. In fact, it was the first university to create an Industrial Liaison Unit, which has evolved into what today is **UMIST Ventures Limited** (UVL). , In the last Research Assessment Exercise (Dec 2001) all UMIST departments were rated 5\*, 5 or 4, indicating that UMIST is judged to have achieved national and international excellence in all subjects. UMIST ranks 2<sup>nd</sup> in generating corporate income and 3<sup>rd</sup> in the employment ratio of its graduates. UMIST graduates (together with Cambridge) are rated top overall for employability across all UK universities, (The Guardian, June 2002). Furthermore, UMIST ranks 1<sup>st</sup> in Business Administration studies.

The most important factor about UMIST Ventures Limited (UVL), created back in 1988, is the company's overall mission; pushing forward the investigation of the institution, both in terms of raising its quality level and improving its transferability into the marketplace. UVL's broad mission reflects itself on its internal organizational. UVL provides researchers with all the services surrounding R&D and innovation. This is its main differentiating factor from other technology transfer companies. UVL is a one-stop-shop for R&D, linking to the private sector and commercializing results. In short, UVL deals with research grants, commercial contracts, patents and spin-offs. When founded, UVL was the first of its kind to incorporate all of these functions. The company values very positively having all these areas unified under one roof. This allows for a great deal of information exchange, the end result being a stronger relationship with the researcher. Consequently, UMIST benefits from an in-depth knowledge of the investigation at UMIST.

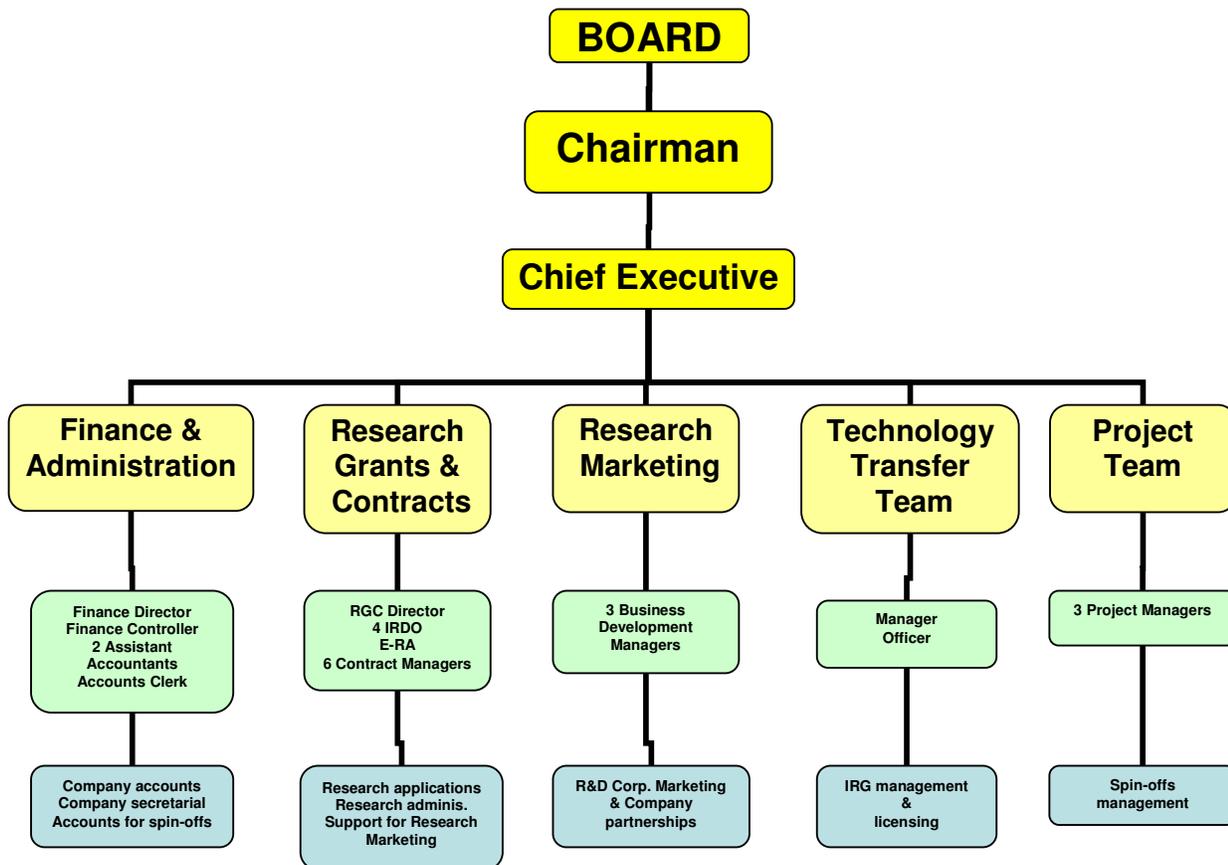
The results achieved over the years are good. UMIST Ventures Limited has helped grow 40 spin-offs in the last 12 years, of which an astounding 3 have gone through the IPO process at the London Stock Exchange. An especially impressive success story is the one of **Knowledge Support Systems**, which will be described further on. In the patent field, UVL has secured 80 licenses. Finally in research financing, the institution is growing at a 30% rate since 1998. The current activity in the technology transfer field

is based in an average of 100 invention disclosures annually. In 2002, UMIST spend 16 million Pounds in research grants and contracts (20,5€ million).

Finally, it is worth mentioning that UMIST is one of the two large universities in Manchester, the other being the University of Manchester. At the present time, these universities are considering a merger with the double objective of increasing competitiveness and reducing costs.

## 22. Internal Organization

UMIST Ventures Limited can best be described by the following organizational chart:



As seen, UVL is a large and well-organized company. Staff tops 20 people. While most of its structure is in line with what you would expect from a traditional TTO there are two additional branches within the diagram that are unique. First of all, the Finance & Administration unit is made up by 5 individuals whom are in charge of keeping UVL company accounts and secretarial duties. Additionally, the staff works as fee accountants for the spin-off companies of UVL. Not only does this provide an additional source of income but it also guarantees UVL a transparent financial picture of its spin-offs.

Secondly, UVL's structure has another branch that promotes R&D partnerships with the private sector. In short, UVL has an in-house marketing department that tries to sell the

university products (research and knowledge). While this is a goal in all TTO's, it is rarely so explicitly approached and implemented.

UMIST Ventures Ltd. also provides services to other institutions outside of UMIST. It has reached strategic partnerships with other research institutions. An example of this is a Manchester cancer research centre that commercializes its findings through UVL. In fact, UVL takes on any good external spin-off project coming from industry. Some of the most notable entities collaborating with UVL are:

- Manchester Science Enterprise Centre (MSEC), supported by the four Greater Manchester universities
- Manchester Science Park
- The University of Manchester
- Manchester Metropolitan University
- University of Salford
- The Manchester Incubator Building
- Manchester Innovation (MIL)
- A joined investment firm with the University of Manchester

### **23. Creating New Companies at UMIST Ventures Limited**

#### **M. Promotion of the entrepreneurial culture**

According to UVL, much of its success in securing the most promising research projects is due to its track record and reputation gained over the years. Reaching 100 invention disclosures a year has not happened overnight. Initially, with a smaller structure, disclosures hovered around 40.

In general, the efforts at UMIST and UVL to promote the entrepreneurial culture do not differ significantly from the ones at other institutions. They include seminars and clinics. Nevertheless, at UVL the idea of promoting spin-off creation does not end once a disclosure has been submitted. Promotion is embodied by the figure of the Project Manager, also known as a project promoter. It is one of the four essential elements needed to create a new company according to UVL (a promoter, a business idea, funding and an incubator facility).

There are also other collaborating entities that share the responsibility of promoting the entrepreneurial culture among academia. **The Manchester Science and Enterprise Centre** (MSEC) is one of them. MSEC is an important government-supported organization that tries to encourage an enterprise culture within the science and engineering departments of the Greater Manchester's universities (University of Manchester, UMIST, Manchester Metropolitan University and the University of Salford). Its stated goals are the following:

- To put enterprise onto the academic curriculum
- To provide the opportunity and inspiration for people to develop their entrepreneurial skills
- To advance technology transfer
- To be a leader of the enterprise movement
- To increase the wealth of the region

To achieve these goals, MSEC offers a master’s degree in enterprise to both graduate and undergraduate students with the explicit objective of producing a working prototype of a high technology product or service. MSEC represents a good source of disclosures for UVL.

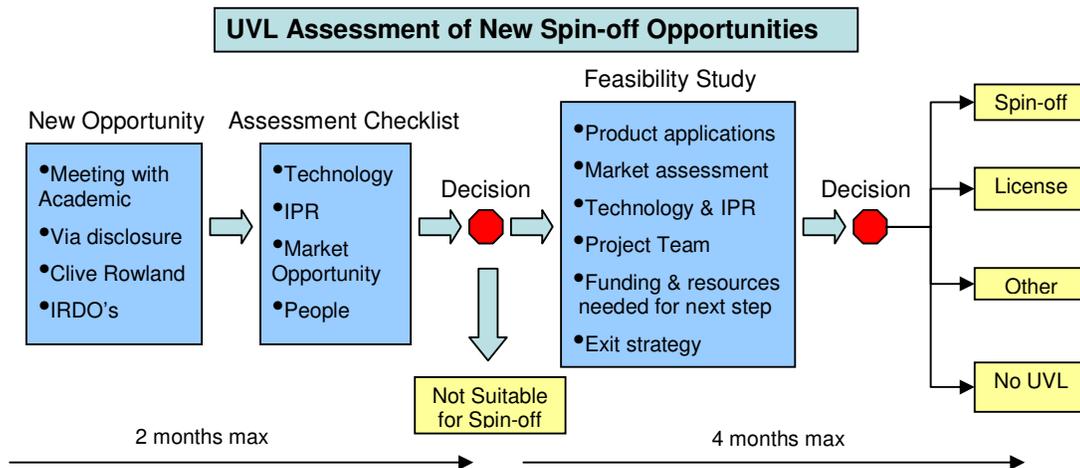
Recently, UMIST department of computation and MSEC have joined forces to launch **IT-VC**, a new centre for entrepreneurship in Information Technology. The IT Venture Centre wants to take research developments in IT into the marketplace. In short, it is an additional institution devoted to entrepreneurship but specializing in IT innovation.

N. Selection of spin-off projects

The selection process of projects begins with the professor notifying of his or her invention to the institution. Such disclosure can be in the form of an informal conversation with a member of the Research Grants & Contracts section, through a meeting with a UVL technology transfer manager or through a disclosure document.

From that point on, an initial 2 months evaluation period begins, during which four key variables are assessed: technology, IPR, market opportunity and people. In many cases, after this initial filter the project is dropped or is not considered adequate for a spin-off structure. If the project makes it through, an in depth feasibility study lasting up to 4 months will take place. The list of variables touched upon during this second evaluation will, justifiably, resemble the index of a business plan.

Once this second assessment comes to a close, a final decision is made as to the chosen structure of the project. The following exhibit summarizes the spin-off selection process at UVL:



If UVL does decide to move forward and create a new company, it can do so without notifying the university. UVL only responds to its own board of directors.

In general, UVL thinks that the assessment process is facilitated by ‘natural selection’. In other words, UVL believes that people tend to screen themselves out naturally, either by having a personality profile contrary to entrepreneurship and risk taking or because of not being keen enough or disposing of enough time to put aside for a new venture.

When time is an issue, UVL will sometimes opt to incorporate a post doctorate to lead the project.

#### O. Support and management of start-ups

The spin-off support effort at UVL circles around the figure of the Project Manager. Currently there are 3 of them. These people have a technical background and previous experience in the business world. UVL project managers must be 'hands-on' oriented but they also keep a strategic vision. They completely immerse themselves on the projects they manage. Initially, help to the entrepreneurs focuses on writing the business plan. Once a project has been authorized, research for funding begins immediately. Further in the development process, the UVL managers become part of the founding team of the spin-off taking on management roles. In fact, a portion of their salary is tied to the results achieved by the spin-offs they help build. Clearly, UVL takes a very proactive role in spin-off support. It is a partner more than an advisor.

When our interview took place, UVL was managing 22 spin-off company projects. Usually, each project manager is assigned 3 or 4 spin-offs. Consequently, around half of the 22 projects are in an advanced enough stage of development that they do not require much support from UVL anymore.

From an employer perspective, having a support system so dependent on a few key project managers has positive and negative effects. Nevertheless, the overall outcome is deemed positive. Project managers at UVL have an unmatched opportunity to learn not only how to build a company from scratch but also how to be a manager. The experience they go through is hard to attain. Therefore, there is good incentive that attracts a large number of well prepared individuals to UVL for project manager posts. On the other side, turnover is relatively high as some managers opt to take off with the spin-off they have help create.

In addition to having a project manager assigned, UVL provides a series of paid services such as the mentioned accounting practice.

For supporting and managing spin-offs, UVL expects a stake in the company. This varies from case-to-case but it fluctuates around 20%. The stake is based on a calculation of the services needed by the spin-off. UVL does not require researchers to put money into the spin-off. UVL does not own the Intellectual Property either. UVL may put cash into projects.

#### **24. Concluding Remarks and Initial Assessment**

UVL is one of the entrepreneurship companies that strongly believe on the importance of *proactivity* to better the odds of success in spin-off creation. Its model revolves around the figure of the project manager whom involves him or herself early on into the project and may even end up taking off with it.

Another important aspect of UVL is the wide range of technology transfer services it offers. In fact, UVL substitutes for a typical TTO. It tries to exploit the benefits of having a global picture about the state of research within UMIST. One of the obvious

advantages is a more fluid relationship with the researcher and early identification of attractive projects. UVL does pre and post award management of research grants.

The results at UVL seem to point out that this model works well for UMIST and the Manchester area in general. 3 IPO are good proof of this. Knowledge Support Systems (KSS) is a prime example. KSS began trading in the London Stock Exchange in March of 2000, raising 55 million Pounds at the time. UMIST pocketed 11 million from the sale of its stake. The promoter of the idea was Professor Madan G. Gings, whom founded the company in 1993 to commercially exploit a new pricing software for products and services. This product has proved especially effective in gas stations and the retail industry.

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- Knowledge Support Systems (<http://www.kssg.com/>)
- The Manchester Science and Enterprise Centre (<http://www.msec.ac.uk/>)

# TRINITY COLLEGE OF DUBLIN



The Innovation Center at Trinity College of Dublin (TCD) was visited on the afternoon of July 25<sup>th</sup> 2002. Dr. Margaret Woods, Manager of the National Pharmaceutical Biotechnology Centre, and Dr. Eoin P. O'Neill, Director of Innovation Services, attended the meeting. Additional material for this report has been provided directly by Trinity College of Dublin. Supplemental sources are listed in the bibliography.

## 25. Introduction

Trinity College of Dublin (TCD) was founded in 1592. It has six faculties: Humanities; Letters; Business, Economic and Social Studies; Engineering and Systems Sciences; Health Sciences and Science. The institution believes it lacks Architecture and Veterinary studies to complete its broad education offer. Trinity College is made up of a staff of 1.600 (of which 1.100 are academics) and approximately 15.000 students. 25% of the student population is postgraduate and over 10% is foreign. In 2000, Trinity College of Dublin had a research budget of 15,6 million Irish Pounds (20€ million), representing 975 projects (244 new in 2000). In that same year, Trinity College participated in 218 EU-funded research projects. Trinity College has secured 20% of the total government research budget. It is the leading research institution in Ireland. In fact, TCD manages this position of privilege quite proactively, aggressively going after any sources of research funding.

Trinity College's mission reflects the new role that universities are expected to play in the future, putting equal emphasis in teaching, research and *community*. The "third track" at Trinity College is known as 'knowledge application in society'. Consequently, technology transfer is of vital importance to the university. The Innovation Center has generated over 40 spin-offs since its inception back in 1986. The center has also been active in the patent field, although not as successfully. It holds approximately 12 live patents.

The efforts in the entrepreneurship field at Trinity College have been backed up by a very ambitious government program called 'Innovation in Ireland'. This program, launched in 2000, represents a turning point in how the Irish government perceives the importance of innovation. Before it, a series of measures such as tax breaks had been implemented to induce foreign investment (corporate tax rate = 10%). These efforts were quite successful. The **Industrial Development Agency** (IDA) continues to work in this front. A second government agency called **Enterprise Ireland** (EI) promotes spin-off creation arising from the private sector.

The development of the 'Innovation in Ireland' program arose from a report published three years ago. The Irish government appointed an expert commission to analyze the relevance of innovation in the economy. The resulting document called "Technology Foresight Report" identified three very important technological sectors: information

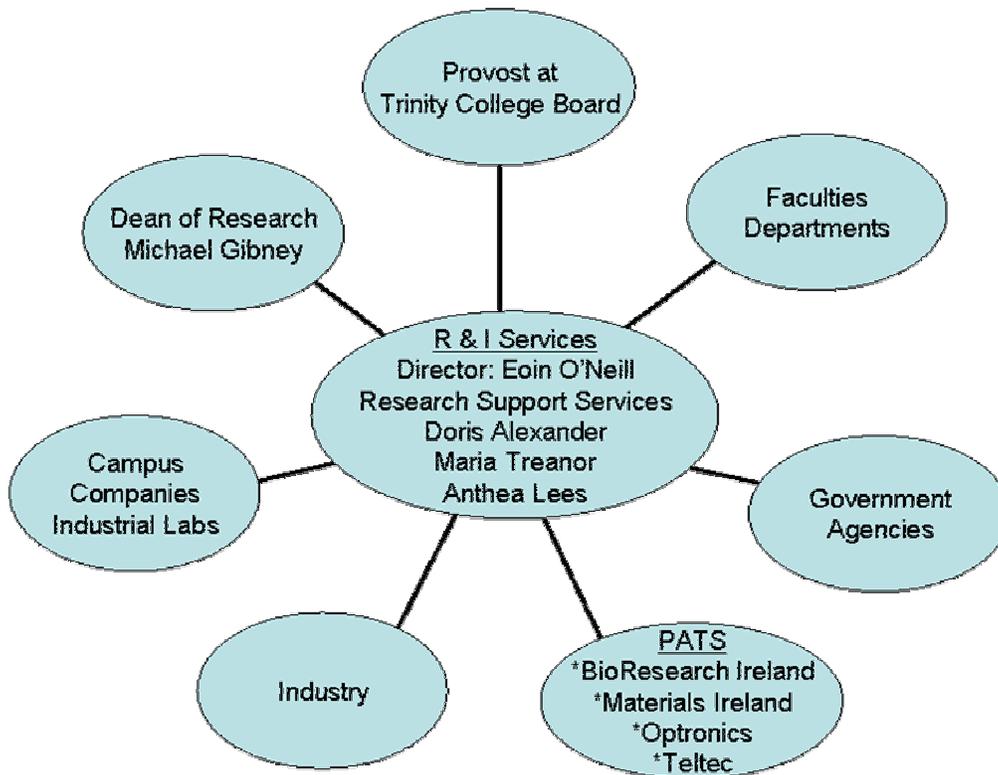
technology, telecommunications and biotechnology. In response to this, the Irish government significantly increased its R&D budget. The **National Development Program (NDP)** has budgeted an investment of 2.5€ billion in R&D until 2006, of which 1.4€ billion go to higher education.

One of the objectives of the program was the creation of new *knowledge-based* companies in the biotech field. In 2002, a series of measures including financing was made available for biotech start-ups. These grants specifically target Irish scientists working overseas and require them to come back to develop their research in Ireland. This specific initiative tries to reverse the historical outflow of highly qualified researchers from the region.

Many of the Irish government programs relating to innovation will be further described in the following section given their importance in spin-off activity at Trinity College, as well as at the other 7 universities and 15 colleges of Ireland.

## 26. Internal Organization

The research and innovation support structure at Trinity College revolves around the **Research and Innovation Services** office (RIS) as seen in the following diagram.



\* *Provost = chancellor / rector.*

As seen, the research infrastructure at Trinity College is quite vast, including the involvement of many major players such as important industry corporations, government agencies and PATS (Programs in Advanced Technology, state and EU

funded). Not only it is the structure extensive but there is seamless barrier between internal and external support in spin-off generation. One should almost talk about a large and ambitious country-wide initiative where TCD plays a major role (instead of viewing what is being done at Trinity in isolation).

The **Enterprise Center**, which was acquired with the help of IDA, is another cornerstone of technology transfer at TCD. The Enterprise Center is essentially an incubation facility located in the heart of Dublin's docklands which houses spin-offs arising from TCD. The Center is 20.000 sq meters and is expected to be filled over time during the next decade. Trinity College expects that this center will produce important investment opportunities arising from the "clustering of expertise, new companies and systems to link entrepreneurs, investors and international companies." Right now, the Enterprise Center is home to 63 companies, of which 14 are TCD spin-offs. TCD tenants benefit from an initial no-fee six month period, after which rents are set at half market prices.

## **27. Creating New Companies at Trinity College of Dublin**

### **P. Promotion of the entrepreneurial culture**

In general, the Research and Innovation Services office does an important task in informing and advising the university community of the existing funding opportunities for research. This, in of itself, is an important promotional effort that will result in increased technology transfer and spin-off activity. In fact, the university considers its efficiency dissemination of research funding information a major key success factor of the institution. It is believed that through the ongoing efforts at the RIS office, researchers are well aware of that there is an open option of "going on their own" and creating a company with the help of the university.

Trinity College of Dublin does also run a series of seminars to inform about the importance of Intellectual Property and how researchers should protect their findings. Seminars about specific industry sectors are also run periodically. Nevertheless, the institution does not offer an educational offer on entrepreneurship or innovation. The **Dublin Institute of Technology** offers a program that allows individual scientist the opportunity to evaluate if they want to move forward with their research and create a company.

Another source of promotion and training for potential entrepreneurs is an initiative called **Campus Company Development Programme (CCDP)** which aims "to assist campus-based entrepreneurs to establish and develop knowledge-intensive, high-tech companies". CCDP tries to help researchers make a realistic assessment of the commercial potential of their findings. Students and researchers are also encouraged to participate in global entrepreneurship programs such as the one being offered through the prestigious **MIT Entrepreneurship Center**.

In general, Trinity College of Dublin tries to target those individuals whom can potentially develop a spin-off project. In summation, TCD looks mainly for active young individuals with a business background or PhD students.

Finally, Trinity's philosophy of promoting self-teaching or self-learning is, in itself, a strong advocate of the entrepreneurial culture. Trinity puts a lot of emphasis in teaching people "to learn and to teach themselves".

Q. Selection of spin-off projects

The overall spin-off creation model at TCD bases itself on a deep knowledge and understanding of the research being carried within the institution. This is possible, in part, thanks to the frequent contact investigator – administration maintained. Consequently, the spin-off selection process also responds to this accumulated knowledge about investigators and their respective research.

At TCD, spin-off projects must be authorized by the Business Industry Committee. Essentially, entrepreneurs must make a presentation of their business plan. The committee tries to respond to three key questions:

- Why should the university support the project? (the university is looking for *additionally*, that is, that the project will have a higher likelihood of success if it is managed internally)
- Can the entrepreneurs find enough financing to support the first year of operations? (Assessment of capital needs and the attractiveness of the project to capital providers)
- Is there a market place? (TCD believes in ultimately letting the market (customers) decide if there is a need for the new company's offering)

Additionally, RIS staff looks at a clear willingness to put the effort necessary, availability of time and a flexible mind set of the founding team which will allow them to compromise and value each other's contributions. TCD also understands that technology is not enough.

Typically, eight to ten research groups are selected per year, resulting in half of them (3-4) being given the campus company title. It is important to point out that these are top research people to begin with, and this success ratio can not be considered universally applicable. TCD approximates that out of the 1.000 research projects, only 100 or 10% can and should be turned into a commercial application either through a spin-off or a patent. TCD objective is to help develop 10 spin-off projects per year, which would triple its current effort.

## R. Support and management of start-ups

Like most spin-off support units, the different instruments available to entrepreneurs respond to the specific necessities during different stages of development (conception, nurturing, adolescence and independence). The following graph summarizes the financial tools available to researchers:

STAGE	INSTRUMENT	FINANCING
Conception	SFI PRLTLI	1,2€ million pa for 5yrs Not fixed, by cycles
Nurturing	ATRP, RIF Innovation P'ships Patenting	500K€, 190K€, 190K€ 24K€ + matching
Adolescence	CORD VC seed funding	24K€ + matching
Independence	Private sector EI (selective)	

At the conception level, funding is made available for basic research. **Science Foundation Ireland** (SFI) is a personal award for a world-class researcher at full dedication. In 2001, 71€ million were given to 11 researchers via SFI. The **Programme for Research in Third Level Institutes** (PRLTLI) as its name implies is given to 3<sup>rd</sup> level institutes for collaboration projects. Help may even be used to build facilities. TCD secured 40€ million in the 1<sup>st</sup> cycle, 15€ in the 2<sup>nd</sup> cycle and 58€ million in the 3<sup>rd</sup> one.

During the nurturing stage, help concentrates in applied research and preparing a business plan. The **Advanced Technology Research Programme** (ATRP) gives financing to complete the last piece of research necessary to launch a company or to license a technology. The **Research and Innovation Fund** (RIF) awards funding for prototype development and proof of concept. Finally, the **Innovation Partnerships** programme is intended to bring university and industry together to complement their expertise in a shared research effort. Funding for the research project is split between EI and the company. All of the above projects are subsidized by Enterprise Ireland.

Finally, during adolescence and independence stages most firms need seed-financing to begin operating. **CORD** is the public instrument for this purpose. Further financing is then left to private actors like VC funds, business angels and some selective funding by EI. Like in most places, private financing for new ventures has not been easy to find. This was an important problem in Ireland in the past. Nevertheless, over the years the situation has improved. Now there are 14 VC firms that operate locally, including the **Seroba BioVentures Fund**, a partnership of EI and Seroba Funds to back up biotechnology projects.

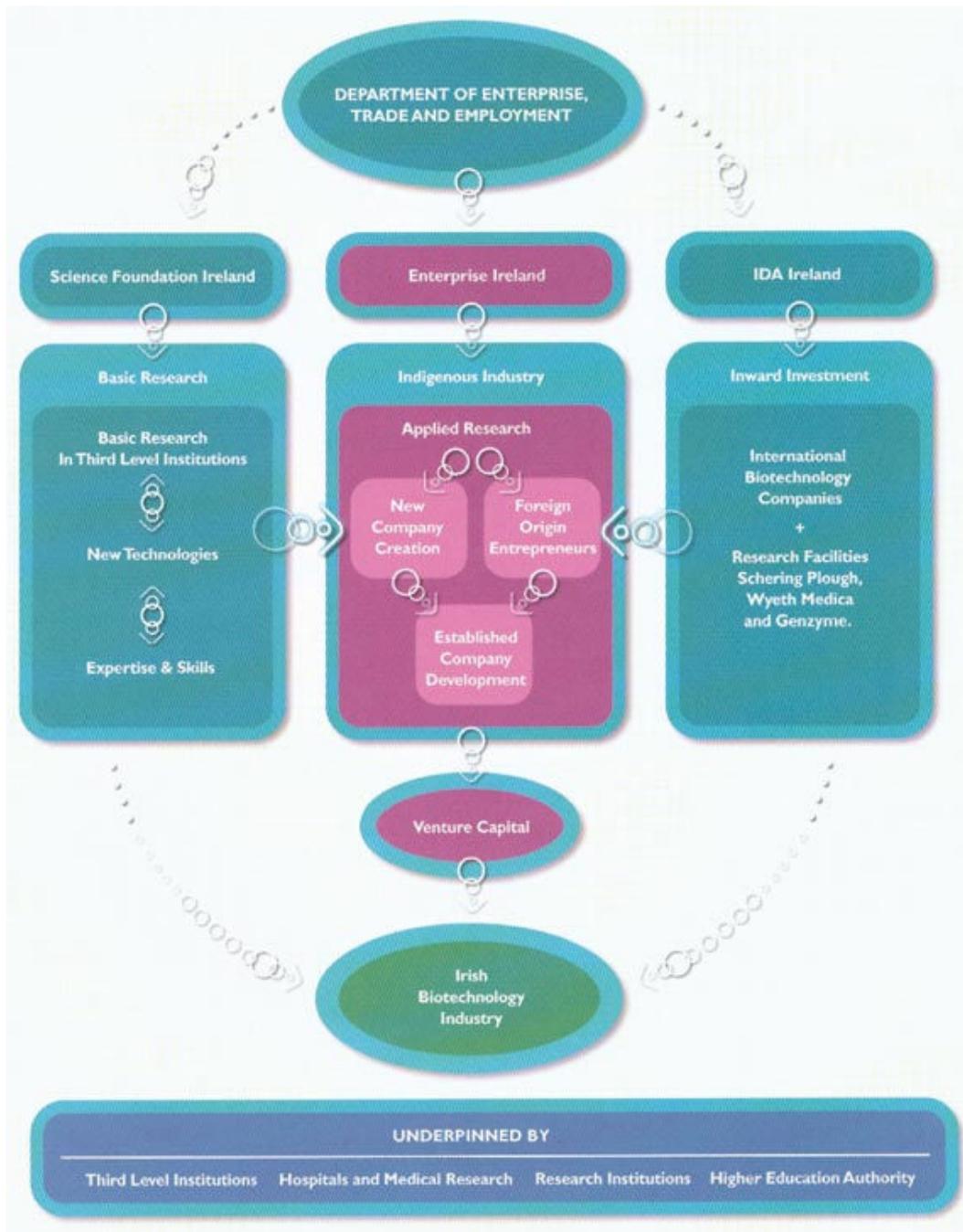
Apart from the research financing instruments described, the Innovation Center at Trinity College is responsible for a series of both tangibles and intangibles in helping entrepreneurs. The center summarizes its support in the following points:

- Space in the right place for low cost
- Access to back-up services and advice
- Prestige address for customer reference

- Networking for technology and ethos
- Clustering target for funders, VC and business angels
- Attractive place for young graduates with options

Furthermore, it is worth mentioning that the philosophy of the TCD's spin-off support is that of being a *facilitator* more than an active partner involved in managing day-to-day activities of the growing company. For example, RIS does not help entrepreneurs write their business plans given its limited resources. The office only refers the entrepreneurs to the sources that will help them in writing a plan. Also, TCD does not usually participate in the board of directors of the new company. Its supervision of progress is therefore limited. In short, at TCD entrepreneurial support is not as active or involved as it may be in other centers. The often mentioned element of "pressure" necessary to move a project forward is not present at Trinity.

What may be obvious by now is the fact that internal and external support is almost indivisible at Trinity College. TCD is in close cooperation with the national agencies implementing the innovation plan. This plan, as previously mentioned, puts special emphasis in developing in Ireland three industries with high potential: biotechnology, information technology and telecommunications. The following diagram depicts the overall support effort being implemented in Ireland in developing the one of these sectors. The drawing shows the Irish organizational structure promoting the growth of the local biotechnology industry.



## 28. Concluding Remarks and Initial Assessment

There are many good things about how the Innovation Center and the Research and Innovation Services office operate at Trinity College. This is no surprise being one of the leading research institutions in Europe. Nevertheless, not all these “good things” can or should be addressed here. Probably, what may be of most value to other entrepreneurship centers and TTO’s in general is the impressive implementation of a long-term plan in conjunction with government institutions to create a new high-tech industrial landscape in Ireland.

The following points summarize the long-term internal view of the university and its strategy to implement:

- Trinity is an asset which can be used for the inward attraction, anchorage, and indigenous creation of new industry in Ireland.
- The asset lies in the College's credibility, the research base, the trained people, the Innovation System developed, and the opportunities thereby created.
- Pilot phase activities in the past decade have demonstrated employment growth. It's time to implement a substantial programme of Innovation.
- By dedicating the Enterprise Centre to University-led projects, substantial economic development rooted in Ireland is achievable and will be rewarding for the community and the participants.

Another key success factor at Trinity is viewing the big picture of technology transfer, like the pyramid that it is, with research at the base and spin-offs and licensing at the top. In short, results are to a large extent a function of resources at the bottom or beginning of the process (research budget, quality of research staff, facilities, etc.).

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# QUEEN'S UNIVERSITY OF BELFAST



QUBIS was visited on the morning of July 26<sup>th</sup> 2002. Mr. David Moore, Investment Executive, attended the meeting. Additional material for this report has been provided directly by the QUBIS and Queen's University of Belfast. Supplemental sources are listed in the bibliography.

## **29. Introduction**

Queen's University of Belfast (QUB) is home to some 17,500 students and has been ranked among the UK's top 20 out of 170 recently evaluated universities for the quality of their education and the degree of excellence of their research. QUB has a staff of 3,500, of which 1,600 are professors and researchers. The university's research budget, with 24 million Pounds (38€ million) under the **Support Programme for University Research**, reflects the credibility of the investigation being done at QUB.

QUBIS Limited was founded in 1984 by Queens University of Belfast to commercialize the research results of the institution via spin-off, focalizing in joint-ventures with industrial partners. QUBIS prioritizes projects based on market potential and is keen on having partner that can complement the technical capacity of university members with commercial expertise and a market presence. For example, having a distribution network already established, being present in a particular market niche or having considerable management experience are variables that QUBIS desires from an industry partner. This is the concept of Corporate Venturing, which at QUBIS is firmly attested by the fact that out of the 30 spin-offs created, those involving as joined-venture with an industrial partner have proved most successful. Corporate Venturing is consequently an important differentiating factor of QUBIS's philosophy and how it tries to operate.

The 30 companies backed up by QUBIS have had a significant impact on the region with 600 new jobs created (one company accounts for 250 jobs) and total revenues of over 32 million Pounds (51€ million), 95% of which is export sales. Nowadays, 4 or 5 projects are managed per year with an objective of creating a couple of companies annually.

QUBIS is not responsible for technology transfer though patent licensing, management of research grants and contracts. This function is responsibility of the Research Office at QUB. Consequently, QUBIS focus exclusively in building new companies and managing investments to maximize profitability at exit.

## **30. Internal Organization**

QUBIS is relatively small company employing the following seven individuals:

- Mr. Edward Cartin, Chief Executive / UCF Manager
- Dr. Pat McComiskey, Project Manager (part time)
- Mr. David Moore, Investment Executive
- Mrs Marie Martin, Administration (part time)
- Mrs Melanie Richmond, Secretarial (part time)
- Mrs Marie Murray, Secretarial (part time)
- Mrs Sue North, Secretarial

In addition, QUBIS Chairman is Professor Peter Mckie, CBE, former managing director of DuPont UK. Finally, the current composition of QUBIS board is the following:

- Prof Sir George S Bain, The Vice-Chancellor of The Queen's University of Belfast.
- Mr Edward Cartin, Chief Executive of QUBIS Ltd
- Prof Roy J Crawford, Pro Vice Chancellor for Research
- Dr James G Doherty, Managing Director - Amphion Semiconductor Ltd
- Mr Frank S Graham, Managing Director - Meridio Ltd
- Prof Brian W Hogg, Former Pro Vice Chancellor for Research
- Mr Tony S Hopkins, CBE Retired Senior Partner with Deloitte & Touche
- Dr Bryan Keating, Chairman of a number of local high technology companies
- Mr Ronnie D Kells, OBE, Former Chief Executive of Ulster Bank Ltd
- Prof Peter McKie, CBE, Former Managing Director of Dupont UK and Chairman of IRTU
- Mr James P J O'Kane, Registrar and former Director of Finance for The Queen's University of Belfast
- Mr Brian O Templeton, Retired Senior Partner with BDO Binder Hamlyn (now Grant Thornton)
- Prof A David Woolfson, Chair in Pharmaceuticals

There is another important actor that is part of the QUBIS structure; The **University Challenge Fund** (UCF). This institution arises from the government's effort, at the end the 90's, with the help of other institutions like Wellcome Trust and Gatsby Charitable Foundation, to establish a series of grants to close the financing gap present in technology transfer. This plan was known as the University Challenge Fund Scheme and a number of universities presented bids to receive financing for establishing a seed venture capital fund. 15 of them were awarded. QUB and the **University of Ulster** (UU), joining forces, secured one of the seed funds (UCF-NI) with 2.75 million pounds (4.4€ million). UCF-NI is managed jointly from the respective commercialization companies of the two universities (QUBIS and UUTECH).The activities of UCF-NI are further described in the following section.

Finally, the efforts of QUB and QUBIS Limited are also backed up by a few more organizations. Among them, The **Northern Ireland Technology Centre**, located within QUB, is a 1.600 sq. metre facility dedicated to technology transfer. It finances itself with income from the industrial services it provides. The center aims are summarized in the following points:

- Provide effective technology transfer to industry and academe

- Ensure maximum use of today's technology today
- Provide a centre for good practice in CAD/CAM technology
- Operate an effective product and process development centre for local small / medium enterprises
- Keep key industrial staff aware of new technology
- Prepare engineering students for industry

**Invest Northern Ireland** promotes economic development in Northern Ireland through innovation and entrepreneurship. For the most part, its services target foreign investment in knowledge-based sectors to encourage relocation or creation of new companies in Northern Ireland.

### **31. Creating New Companies at the Queen's University of Belfast**

#### S. Promotion of the entrepreneurial culture

QUBIS does not run promotional activities to encourage and further develop the entrepreneurial culture. QUBIS believes that it does not fall within its core competences. There is a number of other institutions that can better do this task by organizing business plan competitions, educational seminars, etc. Furthermore, the academic and industrial worlds are quite at a distance apart. Being able to bring them closer together requires time and directing many resources to this objective. Consequently, QUBIS does not promote university-industry interaction.

QUBIS believes the best promotional tool is a good success story. Other researchers will follow on the footsteps of a good success story. This message is evident in its slogan "Turning research into wealth" that not only establishes credibility about the results achieved *through* QUBIS but also serves as a potent economic incentive. In any case, QUBIS is quite knowledgeable about the research being done at QUB, specially those projects with high commercial potential. Therefore, QUBIS tries to maintain a steady communication line with those researchers developing interesting technologies. QUBIS tries to "recruit" key people from faculty that can influence groups.

QUBIS also believes on the phenomenon of spin-offs originating from spin-offs. These are also companies that use university research and know-how. An example of this is **Avalon Instruments** a spin-off of **Andor Technology**, a QUBIS company as well.

#### T. Selection of spin-off projects

QUBIS bases its selection process in three key risk factor evaluations: market risk, technology risk and management risk. Precisely, QUBIS looks for the following:

- Strong evidence of a market opportunity
- The presence of a true leader or "champion" capable pushing the business forward and turning critics into believers
- The presence of a partner or commercial team
- Evidence of significant, profitable growth potential
- A high gross margin reflecting high technology content and a competitive edge

An important part of the due diligence process involves market research to identify competition and substitutes. As mentioned before, QUBIS puts a lot of emphasis on having an industrial partner on board that brings commercial expertise and management experience (two areas of knowledge which university entrepreneurs typically don't have)

If a project is not deemed viable, QUBIS does not communicate a totally negative response to the promoters. They consider it a luxury to turn down any of the few spin-off initiatives that arise. Furthermore, a project can always evolve and it is, to a certain extent, QUBIS duty to make it so. Furthermore, rejecting projects could jeopardize the establishment of an entrepreneurial culture. QUBIS typically will ask everybody to put their vision in writing by completing a business plan, which does not need to be very lengthy. In general, QUBIS tries to get in touch with researchers as early as possible to set a trend that, in time, may end up in the development of a spin-off project.

QUBIS has complete freedom to select and invest in projects as long as they are internal. The selection process begins when a proposal arrives. The project is analyzed by a staff member and if it looks promising it is openly discussed with the other members of the unit. Following, the proposal is presented to the investment committee that authorizes the project and sets the participation of QUBIS. The offer made to the promoters is in form of a simple, short contractual agreement, which puts special emphasis in goodwill of both parts. At this point, the support process of creating and growing a new company begins. QUBIS looks for initiatives where profitability can be reached at the two year mark for service companies and in less than 5 years for industrial projects.

Initially, QUBIS tries to minimize the costs associated to the new venture. Those expenses derived from the investment of QUBIS are charged to the spin-off. Transfer of intellectual property is done in a two step process. Firstly, QUB assigns the right to QUBIS, which in turn will transfer them to the spin-off.

#### U. Support and management of start-ups

During the development of the spin-off, QUBIS selects one of its staff members as project manager of the new venture. This person is totally immersed in the project. Consequently, a manager can only coordinate a limited number of projects (typically 5-10). QUBIS does not seem to establish a very rigid follow-on schedule. Its philosophy is to accompany the promoters when help is needed and not to introduce pressure unless necessary. Additionally, QUBIS has a representative on the board of the spin-off. Another valuable input that it can offer to companies is the important network of contacts and know-how, which is possible precisely through the many seats in company boards of its spin-offs. The company boards do act as a 'sounding board' to the promoters.

QUBIS also provides all of the services that the University Challenge Fund offers, as part of the actual structure of this organization. UCF does all of the following services relating to new venture creation (obviously there is a large degree of overlapping and consequently savings by sharing a single structure):

- Sourcing suitable commercial partners and corporate venturers

- Assistance in developing your business plan
- Accountancy services
- Advice on Intellectual Property issues
- Advice on formulating legal agreements
- Company secretariat services
- Access to incubation centres
- Contacts with the local 'business angel' and venture capital network
- Connection with the relevant government assistance programmes
- Strengthening the management team by the appointment of suitable non-executive Directors

In reference to the facilities that QUBIS and UCF makes available to spin-offs, there is no defined central incubation space per se. The University itself is very supportive of spin out activity and will try and find adequate space within the university campus, as close to the research group as possible. While this is motivated by a lack of an incubator, QUBIS staff likes this model as it turns the whole campus in an incubator or scientific park. According to them, QUB “is the equivalent of a Science Park without the real estate”. While this is just an anecdote, it may very well depict the right frame of mind to approach spin-off support.

QUBIS, in exchange for services rendered, for transferring QUBIS intellectual property and for cash contributions, takes a stake in the spin-offs. These participations vary widely from project to project but the same principle remains. QUBIS tries to secure the highest possible stake that will nevertheless keep the promoters happy. That is, reaching for the highest return that is fair in the minds of researchers (so not to jeopardize the future of the company). Typically, QUBIS’s participation ranges from 5% to 20%. Below is a listing of QUBIS companies with their respective participations:

Order of Foundation	Spin-off	% of QUBIS Participation
1	MARENCO	27
2	KAINOS SOFTWARE	39
3	LUMICHEM	33
4	VINIFER	51
5	ANDOR TECHNOLOGY, Ltd	9
6	AMPHION SEMICONDUCTOR	19
7	ROTOSYSTEM	34
8	HUGHES & McLEOD	16
9	BIOCOLOR, Ltd	20
10	OSPREY ENVIRONMENTAL	24
11	LAGAN TECHNOLOGIES	10
12	ACHECK, Ltd	10
13	QUCHEM	10
14	DREAMTIME INTERNET	25
15	AMACIS, Ltd	1
16	CARAPACICS, Ltd	10
17	XIOMATERIA	23
18	G.SCOPE	25
19	AVALON INSTRUMENTS	3
20	STREAMON	5
21	ALTA SYSTEMS	20
22	MERIDIO	33
23	QUESTOR	20

QUBIS has already realized investments on the following spin-offs: Textflow, Audio Processing Technology, Biosyn, Merlin and Global Telemed. These investment exits have provided a return on investment for the university.

Finally, financing for spin-offs can be further obtained through the University Challenge Fund (UCF). As seen, UCF's role is to provide a source of seed capital to promote the commercialization of research results. It tries to close the financing gap for university projects until private actors step in. UCF does not limit its activity to any sector but it tries to respond to the needs of biotech companies in particular given the high risk involved in this area. UCF does also take an equity stake in the new company in exchange for financing which ranges from 25.000 to 125.000 Pounds (40.000€ to 200.000€). Company constitution is not a requirement. Help can go towards protecting intellectual property or preparing a business plan. This type of help is called PathFinder. UCF is another source of income for QUBIS. It receives a management fee for fund management services rendered.

In general, developing financing instruments has not been easy at QUB. To put things in perspective, QUB had invested a total of 1 million pounds during a period of 17 years prior to the appearance of UCF. The budget was very limited and this made riskier investments unlikely to assume. Now, UCF allows QUB to take on bolder projects with more upside potential.

Promoters are expected to contribute a minimum of 1.000 Pounds in cash to the spin-off. This is viewed as some sort of guarantee of compromise and seriousness of the initiative. UCF also requires a representative on the board of the company, usually shared with QUBIS Ltd.

### **32. Concluding Remarks and Initial Assessment**

There are two elements that impregnate the operation of QUBIS. Firstly, it focuses on spin-offs. This is truly a center of entrepreneurship. QUBIS does not deal with research grants, contracts or patents (beyond those related to protecting the technology of its companies). Furthermore, even within entrepreneurship, QUBIS focuses on support, leaving aside a bit the task of promotion the entrepreneurial culture or having to manage an incubator.

Secondly, QUBIS focuses on creating joint-ventures with an industrial partner. This should "ease" somewhat the difficult task of entering a market as a new product or service. QUBIS strongly believes that a partnership betters the odds of success of a university spin-off.

Additionally, QUBIS also identifies as a critical success factor relationship management with researchers. QUBIS provides, for the most part, total financing in conjunction with UCF, at least for the early stage of development. Local VC's participate in some projects. In any case, QUBIS views its practice as a business that bases its survival on achieving a steady stream of income.

Finally, it is interesting to point out that like in Ireland, in Northern Ireland innovation is perceived as a critical issue for the region. This view originates from an *educational comparative advantage*. That is, the strategy of building a knowledge-based economy responds to, and is possible thanks to, a strong educational system that delivers a highly-qualified workforce. The government's investment in education is quite

significant (22% for NI versus 13% UK average, 14% USA). This is coupled with a young population that grows at an above average rate.

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# UNIVERSITY OF CAMBRIDGE



The University of Cambridge (UC) was visited on the afternoon of July 30<sup>th</sup> 2002. Mr. Robert T.J. Marshall, Head of Technology Transfer, and Dr. Anne Blackwood, Technology Transfer Associate, attended the meeting. Additional material for this report has been provided directly by the University of Cambridge. Supplemental sources are listed in the bibliography.

### **33. Introduction**

The University of Cambridge is one of the oldest universities in the world and one of the largest in the UK. The outstanding quality level of the research undertaken at Cambridge has resulted in over 60 Nobel Prizes awarded to its members. The breadth of research is impressive covering a wide range of sciences, arts and humanities. The University of Cambridge is specially well-known for its research in understanding of diseases, creation of new materials, advances in telecommunications and understanding of the universe.

The University of Cambridge is home to over 16.500 students, of which nearly 5.000 are postgraduate. 17% of the students are from overseas. The student body is equally split between science and art subjects. The staff of Cambridge is around 7.000 members, including assistants and administrative staff. The University of Cambridge is self-governing with the Regent House, formed by 3.000 members, as its legislative authority. Another important element of Cambridge is its structure of Colleges. These are also independent, self-governing bodies that manage their property and income on their own. In short, each Cambridge student must belong to one of the 31 College communities. Through this system, Cambridge believes it manages to deliver a closer, personal attention to its students which in turn results in a very low failure rate.

The University of Cambridge has a total income for 2001 of £396.5 million. Research Grants and contracts represented 31.6% of total income.

<b>Source of financing</b>	<b>Amount</b>
High Education (HEFCE) and TTA	£127.3M
Other Research Grants and Contracts	£77.1M
Research Councils	£49M
Endowment	£49M
Other Op. Income	£44M
Fees and Support Grants	£31M
Oversees Fees	£19.6M

The **Technology Transfer Office** (TTO), as part of the Research Services Division, is the unit that informs and advises researchers about intellectual property and protects these rights for the institution. The TTO also manages patent licensing to established

firms or spin-offs of the university formed to exploit its IP. The office is also utilized by CMI (The Cambridge-MIT Institute) in relation to IP evaluation and administration.

Cambridge's TTO was only created three years ago. There are a number of other institutions that collaborate with it in the field of innovation, technology transfer and spin-off creation. They will be further described in the next section. All of them, in conjunction with the TTO, are responsible for what is known as the "Cambridge Phenomenon". This is the name describing the economic transformation experienced by Cambridge since 1978, when there were only 25 high-tech companies employing 2.000 people. Nowadays, with approximately the same population of 100.000, there are 1.500 so-called "knowledge companies" employing 40.000 people. Each month, 25 new companies are created in Cambridge. Part of the credit for this success story corresponds to Barclays Bank who realized an initial study about economic development emphasizing the importance of generating new knowledge-based enterprises. St John's Innovation Center is the other major institution originally responsible for the "Cambridge Phenomenon". St John's Innovation is part of St John's College at the University of Cambridge.

In general, although Cambridge is pioneer in this field UC's efforts in spin-off generation are surprisingly recent. During many years, there wasn't a well-organized support structure, nor did the university participate on the entrepreneurial initiatives that arose within campus. The university prioritized and preferred contracting over other potential lines of technology transfer, as it believed that it benefited a larger number of enterprises. This view has changed and now the university is shareholder in its spin-offs. UC has obtained £5 million from eight spin-offs and two start-ups in just the past three years, having. Also, in 1999 the Cambridge Entrepreneurship Centre (CEC) was founded with the objective of promoting spin-off activity and its culture.

As far as results, the university has generated a total of 36 spin-offs, of which 17 are from Physical Sciences and 19 from the Life Sciences. In 2001, the TTO managed 140 disclosures resulting in 60 patents and 30 realized license contracts. Patent figures are in line with other experiences.

#### **34. Internal Organization**

Essentially, the University of Cambridge bases its research management and technology transfer structure on the **Research Services Division (RSD)**, which is made up by the two first units described in the following list of internal organizations devoted to innovation, technology transfer and spin-off generation:

- **The Research Collaboration Office (RCO)**: manages sponsored research at UC, that this, research contracts with industry. (Part of RSD)
- **The Technology Transfer Office (TTO)**: made up of 13 technology transfer managers. (Part of RSD)
- **The Cambridge University Technical Services (CUTS)**: is a limited company that manages the consulting services that academics offer to the private sector.
- **The Cambridge University Challenge Fund**: is one of the 15 national seed funds awarded to help bring research findings into the marketplace. This fund can deliver financing anywhere from £5.000 to £250.000, helping close the financing gap present when a research project wants to move to a stage where a decision on

commercialization can be taken. Basically, the Challenge Fund offers three instruments:

- PathFinder: Financing up to £10.000 for market research, assessment of IP, a marketing plan, defining a strategy, etc.
- Applied Research: Financing up to £10.000 for proof of concept, building of prototypes, etc. The result of this stage may be reaching a licensing agreement or deciding to create a spin-off.
- Seed Funding: If the decision to create a spin-off has been taken, financing for up to £250.000 is available. Funds are also available when considering a joint-venture or some type of strategic alliance.
- **The Corporate Liaison Office**: acts as the facilitator of contacts between the university and the private sector and other institutions.
- **The Cambridge Entrepreneurship Center (CEC)**: serves three purposes; promoting the entrepreneurial culture, educating future entrepreneurs and supporting developing initiatives. Created with a £2.9 million subsidy from the **DTI** (through the Science Enterprise Challenge Fund), it consulted over 100 new companies in 2001.
- Finally, the University of Cambridge also has its own investment company that channels second round financing to spin-offs.

Additionally, the spin-off support structure at the UC is completed with the premises of the **Saint John's Innovation Park**, founded in 1987 by Saint John's College to promote the creation of technology-based enterprises. The tenants of this park are start-ups, technology-based companies founded in the past 5 years and technology service companies. The park is managed by the **Saint John's Innovation Centre**, which is an accredited **BIC** (Business Innovation Centre) as an Innovation Relay Centre. Finally, the premises of the **Cambridge Science Park**, founded by Trinity College back in 1970, are also available for young high-tech companies.

### **35. Creating New Companies at the University of Göteborg**

#### **V. Promotion of the entrepreneurial culture**

Essentially, the philosophy of the Technology Transfer Office is to collect as many proposals and ideas as possible, independently of their importance. This philosophy is exemplified by one of their sayings: "tell us also about your small ideas". In this way, if the commercialization process is viewed as a funnel, the University of Cambridge tries to expand the circumference of the entryway (or deal flow). Promoting the commercialization culture is done by informing investigators with departmental visits, seminars, talks and publishing support materials.

Additionally, much of the promotional effort in new venture creation is now channeled through the Cambridge Entrepreneurship Centre (CEC). As mentioned, this centre was created only three years ago to complement the institutions strategy in technology transfer. CEC is made up of a team of individuals coming from the consulting sector, specialized in advising early stage projects and helping write business plans. In short, the center would like to help impulse projects to the point when they are ready to approach a capital provider for financing.

Finally, **Cambridge University Entrepreneurs** is the student society that organizes two well-known business plan competitions; the £1K business plan contest and the £50K business creation competition.

#### W. Selection of spin-off projects

As mentioned, the University of Cambridge makes an effort to promote disclosures. Nevertheless, the TTO makes a clear distinction when analyzing them as to what may seem interesting commercially and what is truly viable.

#### X. Support and management of start-ups

The University of Cambridge makes a clear distinction between the three main lines of activity within technology transfer. Firstly, in relation to sponsored or collaborative research the university believes that this activity generates new ideas and inventions that usually become property of the institution. It is the Research Collaboration Office that manages these contracts and arrangements.

Secondly, UC's consulting activity, referring to the expert service that investigators can offer to the private sector, can take two routes. Professors may opt to undertake this activity from within the university, utilizing its name and being covered by an insurance. In exchange for this and having to administer these activities, the university through CUTS (Cambridge University Technical Services) charges 10% on the bill. UC does not limit the activity of its staff members in this area. This is a bit of an exception in the UK. Most universities do have a maximum number of days that professors can allocate to their consulting practice. For example, Leeds allows 30 days a year. At UC, it is the department's role to make sure investigators do not abandon their duties to focalize on consulting or another activity. Nevertheless, these activities are treated with transparency and in a climate of trust and goodwill.

The other option available to investigators is to run their business practice outside of the university. In such cases, they may not use the name of the institution, nor can they use university facilities and will not be protected by the insurance. The consulting practice is good to bring closer university and industry. Results from consulting services are almost without exception property of the contracting company.

Finally, technology transfer at UC also involves two other routes to the market: patenting & licensing and spin-offs. The TTO works closely with the Research Collaboration office to analyze potential intellectual property arising from sponsored research. TTO personnel evaluate the novelty level of an invention utilizing tools supplied by a company called **Nerac**. This company specializes on helping researchers locate patent development and research specific information. In other words, one could define Nerac as a research market intelligence company. Nerac offers a variety of customizable searching products as well as access to information specialists. If the decision to protect a technology is made, the process of writing and managing the patent application is outsourced. UC's does nevertheless assume the challenge of commercializing the patent through licensing.

Once a technology has been protected, there are two possible scenarios moving forward: searching for an established company willing to license it or considering, under the

leadership of one of the investigators, the creation of a spin-off to whom the IP will be transferred. It is impossible to set a clear criteria as to when which route is chosen and why. It is on a case-to-case basis. In general, choosing the spin-route will mean a strong commitment by the investigator and usually demands a radical innovation. On the other hand, for incremental innovations the patent route is deemed more appropriate. Furthermore, according to the management of the TTO, there is not a correlation between the field or academic area and the best route to the market. UC has patents and spin-offs from the Physical and Life Sciences in almost equal measure.

In general, technology transfer is viewed as a small source of financial resources for the university, especially in comparison to other sources of research funding. At other top research institutions, such as MIT where technology transfer is important, this activity only represents 3% of the budget. UC believes that spin-offs are fashionable now in Europe and that this trend is not completely justifiable. One must ask him or herself about the reasons that make governments support and encourage so strongly spin-off generation. Is it a measure to encourage regional development? Does it represent a new income stream for universities? According to the director of UC's TTO, the biggest difference between income from royalties and income from a spin-off is the frequency of the inflows. For patents income is usually small and constant while for a spin-off it is punctual, larger and questionable. The spin-off route presents a few additional problems too. First, returns will only be reached in the long run as the time necessary for maturing a business is typically near the 10 year mark. Secondly, an institution must create (and therefore invest on) a large number of new companies before it can guarantee significant returns from either sale of shares or profit sharing. In fact, profit sharing is very difficult to achieve. The UC experience shows that none of the more than 30 spin-offs created has declared a profit in the past 5 years. On the other hand, commercialization through licensing of patents is experiencing sustainable growth at Cambridge.

The University of Cambridge does nevertheless take a stake on its spin-offs. Distribution is as usual with a share going to the investigators, another stake to the university and the remaining part to the investors. Share allocations are negotiated on a case-by-case basis without following a strict guideline. In relation to IPR in patents, the distribution is clearly defined in the university's policy as follows:

	Inventors (jointly)	University	
		Department	Central Funds
Net Income	(%)	(%)	(%)
First £20 000	90	5	5
Next £40 000	70	15	15
Next £40 000	50	25	25
Above £100 000	33.3	33.3	33.3

### **36. Concluding Remarks and Initial Assessment**

The University of Cambridge is an impressive university in many ways, beyond its proven excellence in both research and education. In relation to new venture creation, there are only two other locations aside from Cambridge that have undergone an economical transformation similar to the so-called “Cambridge phenomenon”. These are Silicon Valley and Boston’s route 128. All of them share having top educational centers being able to supply new companies with highly-talented young professionals, inventors and entrepreneurs. Beyond this role, it is clear that the private sector has very efficiently managed to develop the economy with limited support from within the universities. If we take this into account and we consider the implications that a spin-off program means for a university (a large long term investment and questionable returns), we could put into question the role of university spin-off programs. While this is provocative, it may also be stimulating and interesting to take into account. It is beneficial that all aspects and views on entrepreneurship at universities are weighted.

Visiting Cambridge has brought out such issues. For many years UC had little policy or structure to support spin-off activity (given that the private sector gave response to the need this need very successfully). On the other hand, the environments at Cambridge, Silicon Valley and Route 128 are clearly exceptions contrary to the norm.

We thought that the above view was worth emphasizing in our analysis. In general now, the elements that characterize today’s new venture creation at UC are the following:

- Given the above rationale, the role of UC in promoting an entrepreneurial culture is not as active as other similar institutions.
- The support structure is still under construction. The Technology Transfer Office which must handle early development was recently created from the Wolfson Industrial Liaison Office. Also, The Cambridge Entrepreneurship Center is quite new.
- The long-established and preferred route to the marketplace is patenting.

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- Nerac (<http://www.nerac.com/>)

# UNIVERSITY OF SOUTHAMPTON



The University of Southampton's Center for Enterprise and Innovation (CEI) was visited on the morning of July 31<sup>st</sup> 2002. Mr. Tony Raven, Director of the CEI, attended the meeting. Additional material for this report has been provided directly by the University of Southampton's CEI. Supplemental sources are listed in the bibliography.

## **37. Introduction**

The University of Southampton was founded in 1952, only 50 years ago. It is home to some 19.000 students and a staff of 4.000. Being such a young university, one would expect Southampton to lack certain assets derived from history, tradition or having an established track record. In fact, compared to Cambridge and Oxford, the University of Southampton is much smaller in resources. On the other hand, the university benefits from not having inherited any historical shortcomings.

In any case, the University of Southampton is widely recognized as one of the top ten research universities in the UK. 80% of researchers are rated 5 stars. Taking into account that the UK's research financing system is based on quality ratings, the university benefits from its excellence in many fields and secures a significant amount of financing. In particular, Southampton received £59 million (94€ million) in external research financing for 2002. Investigators rated 5 stars, in addition to being awarded research projects, can also ask for an additional £25.000 per year.

The first spin-off of the institution was created in 1969, logically, without any support from the university at the time. In fact, some 50 companies have been created from researcher's initiatives without the university's involvement. In a decisive move, the university created two new support units to impulse technology transfer. First the Office of Research Support was founded to manage research contracts and IP. Later on Southampton Limited was created, which took on responsibility for spin-off activity. In the year 2000, the university decided to merge these offices considering that the units of IP and spin-offs should not remain apart. It marked the foundation of the **Center for Enterprise and Innovation** or CEI.

CEI is today's technology transfer unit of the University of Southampton. Its duty is to commercially exploit the investigation that takes place within the university, via patents or spin-offs. The University did not want to assign the duties involving research contract management to CEI. The decision was based primarily on the important difference in time frames relating to these activities. In particular, contract's management focalizes in short-term while patents and spin-offs are long-term activities.

Unlike other centers, CEI does not have an independent legal entity. Different local and regional organizations were founding members of CEI, including several investment firms (WessexBio and IP2IPO). The university valued the pros and cons of giving the CEI an independent legal entity. An external enterprise means more flexibility and freedom to choose how to run the company. On the other hand, university members consider external companies foreign to the community, as if they were not part of the university. Consequently, you loose proximity with researchers. Furthermore, most researchers are not used to being supported by the university administration; they are not used to delegating. This means that establishing trust is essential. Being close is also important to be able to communicate in detail the actions being taken. In the end, the university valued proximity and trust as essential elements it needed to keep and CEI remained part of the University of Southampton.

In relation to results, right now CEI creates 1 to 3 new spin-offs per year. In the patent field, the institution used to generate one patent per year. Right now, this rhythm has increased to one per month. The Medical School alone has generated a portfolio of 60 patents. Nevertheless, CEI believes that a good measure of performance is not necessarily the number of spin-offs or patents generated (quantity) but the success of these companies and licenses (quality).

Finally, Southampton is know for having given birth to the biggest spin-off in the UK's history; **Southampton Photonics**. This company originated from the Optoelectronics Research Center (ORC) and was founded by its director, Professor David Payne. In 2000, the company got a financing round of £37 million. The company's products are directed towards improving communication through optic fiber.

### **38. Internal Organization**

The staff of CEI is made up by the following individuals:

- Dr. Tony Raven (Director)
- Dr. Peter Hooper (Deputy Director)
- Dr. Georgina Richards (Solicitor / Lawyer)
- Mylène Ployaert (IP Manager)
- Mike Stannard (Business Manager)
- Sue Sundstrom (Business Manager)
- Giles Edward (Business Manager)
- Antriana Raymond (Secretary)
- Rosy Jones (Business Dev. Manager)
- Julie Lees (Contracts Adviser)
- Tina Johnson (Office manager)
- Laura Keene (IP and Marketing assistant)
- Dr. Stephen Flood (IP2IPO)

*\*Recently four other individuals have joined the team*

CEI is organized in two teams: Physical Sciences and Live Sciences. These teams are made up of business managers that come from the private sector. CEI does not necessarily look for people that understand the technology but for people that understand the *commercialization process* of the technology. Their job is to support researchers in all those matters relating to commercialization (like writing the business

plan). When a spin-off has been created, the business manager turns into what is known as a Project Leader, taking full responsibility on the initiative. As in other places, given that the salaries that CEI can afford are below market rates, they allow business managers to become part of the spin-off.

The rest of CEI's personnel support the project leaders. CEI also tries to work with researchers in the fields of humanities and the arts. They have recently incorporated a manager with this background.

In relation to the external organizations working with CEI, it is important to point out that the center views strategically the new associations it is trying to build with other institutions in the south of England. In particular, CEI wants to develop an incubator facility in conjunction with three other universities (Bath, Bristol and Surrey). CEI believes that the trend started by the University Challenge Funds and other initiatives like the Science Enterprise Challenge Fund or the Higher Education Innovation awards, are key relationships for the future of universities.

An important partner to CEI is **IP2IPO** which is an investment firm that specializes on commercializing intellectual property (and, as mentioned, a shareholder of CEI). IP2IPO focalizes on the seed financing. This company maintains close links with a number of universities. In Southampton, IP2IPO has created a £5 million fund for university spin-offs. The relationship with IP2IPO is very close indeed. IP2IPO can be considered part the permanent structure of CEI. In fact, one person of IP2IPO is located at CEI to help develop the spin-offs. In exchange, IP2IPO receives a 20% share on **SAM** (Southampton Asset Management, which is the entity utilized to commercialize the university research results).

Another significant partner is the **Chilworth Science Park**, which is promoted by the university itself and is located conveniently close to campus. Its park model implies not having research groups on site, only companies. Merck has centralized all of its R&D activity in England here. Given the proximity of the park and the university campus, there is an increased linkage between both groups, as one would expect. Finally, **SULIS** is a seed stage investment fund servicing the universities of Southampton, Bristol and Bath.

### **39. Creating New Companies at the University of Southampton**

#### **Y. Promotion of the entrepreneurial culture**

CEI does not assume directly those activities relating to the promotion of the entrepreneurial culture. In fact, it likes to transfer this role to external organizations. For example, the formation of entrepreneurs is channeled through the **School of Management**. CEI has sponsored the creation of a section at the School of Management's library devoted to entrepreneurship.

CEI believes it could not possibly analyze all the research being carried at Southampton. Nor do they want to pressure researchers into presenting spin-off initiatives. Therefore, the philosophy is to get close to the researchers by making information available to them through seminars and talks, trying to make them understand the importance of protecting their research and the benefits to society. When

facing the dilemma of “to publish or not to publish”, CEI tells researchers that if all investigators published their findings no new medicines would ever reach the market as the commercial opportunity to exploit the findings disappears once they are published. Therefore, there is no real incentive to go through the costly process of bringing the discovery into the marketplace.

In general, the promotional effort is low, in line with Oxford’s Isis policy. Both companies remain low-key until the project is accepted and then they show a high degree of involvement and proactivity during the business development.

#### Z. Selection of spin-off projects

As mentioned in the previous section, CEI allows the selection process to happen somewhat naturally by itself, given that it puts little resources into promoting the entrepreneurial culture. Therefore, it does not actively manage its dealflow, that is, trying to considerably extend the number of disclosures it receives. Also, CEI always leaves the last word to the investigator about moving ahead with the spin-off. In some cases, CEI does recommend researchers to drop the project. This can be considered an exceptional situation.

#### AA. Support and management of start-ups

First of all, CEI is of the opinion that university entrepreneurs face more difficulties and obstacles than external ones. Some of this is due to the perception from the private sector and some of this may be due to the profile of researchers themselves. In any case, the level of hand-holding to launch a university spin-off is high.

Secondly in terms of the general approach to technology transfer, Mr. Raven describes the philosophy of the center pointing out that its responsibility lies upon managing the intellectual property process, not only protecting IP. In short, it reinforces its focus of managing the whole commercialization process instead of having a purely administrative approach to the job.

Also, CEI realizes that there are significant differences between the Physical and Live Sciences. Development time for Physical Sciences is shorter. Therefore, time-to-market is crucial. On the other hand, with the Live Sciences development time is much longer and protecting the technology is essential. The Physical Sciences spin-offs try to cover a gap. They try to prove that a technology is viable for a market. Once the technology is in an advanced stage of development, the spin-off is usually acquired by a sector player. In the Live Science field, the process is more linear. Entrepreneurs need astonishing amounts of money, following the different stages of development of the technology. Investment companies utilize sophisticated mathematical models to analyze an investment’s profitability, capital needs per stage, etc. In summation, what is relevant is understanding that a support system is not uniform and may respond individually to the specific needs of a field or a company characteristics. Certain models for certain fields can be successfully derived but there isn’t a so-called ‘one-for-all’ method and solution to supporting spin-offs. CEI believes that, as a rule, 70% of all spin-offs created are in the Life Science field. Statistical data from both in the US and UK support this view. Contrary to this, Southampton seems to focus on Physical Sciences.

Chronologically, CEI's first step is to protect the technology once it receives a disclosure. After, a few elements are analyzed such as the market. At this stage, CEI considers very important to determine exactly what is it that the research group wants to achieve. In relation to this, CEI tries to limit the role that the head researcher will play in the new venture. The expectation is that the investigator will remain on campus managing its research group, and at the same time, become an essential R&D supplier or advisor to the spin-off. The new company will look for postdoctoral students that understand the technology. One of them should eventually become responsible for R&D at the new company. Finally, the team is completed with a manager, found usually through a head hunter.

In relation to the capital structure of the spin-offs, CEI follows these steps to determine the partners of the new company:

- As soon as the disclosure is presented, a company with 100% ownership of the inventors is created. The distribution among investigators is made according to the parameters declared in the disclosure. The director of CEI says that this measure avoids problems down the road.
- If the spin-off proposal does not take off, the cost of constitution is lost.
- If the spin-off goes ahead, a portion of the shares will be transferred to the new entrepreneurs that are incorporated into the project, such as management.
- The University of Southampton receives its share, relatively late into the process, once a venture capitalists enters into the project. The definition of the universities share is made in good faith by all parties in exchange for the intellectual property transfer. Usually, after all this process, the founding entrepreneurs share is 25%. The venture capitalist has a defined share based on the valuation of the spin-off and the investment size. The rest is for the university.

Essentially, there are two reasons why the university acts in this manner. According to Mr. Raven, under the current legislation if the university takes over 20% of the share of the spin-off it must consolidate financial statements. Additionally, when looking for the financial backing of investors the university would have to undergo the audit practices of the governmental agency in charge of supervising capital markets. Therefore, avoiding the initial involvement of the university avoids both issues. It is assumed that once a venture capitalist enters in the project, the share of the university will be less than 20%.

The University of Southampton participates in its spin-offs through **Southampton Asset Management** (SAM). In terms of returns, CEI's director believes that spin-offs don't generate significant returns before 10 years. In fact, equity stakes are unimportant in his view. The essential benefits of spin-off activity are through the research contracts formalized between the spin-off and the university. This is an important income stream that justifies the spin-off structure by itself.

#### **40. Concluding Remarks and Initial Assessment**

CEI, and the University of Southampton as a whole, share the philosophy of spin-off generation with other renowned universities such as Oxford. Southampton seems to put a lot of emphasis in collaborating with other institutions in field, such as other

universities or venture capitalists. It considers this an important strategy to opt for, and access, all the resources that are available and that their entrepreneurs may need.

In short, the differential elements of the university can be summarized in the following points:

- Relatively new university but quite active and renowned for its research
- Recently, the support structure in technology transfer has been reorganized with the creation of CEI, now responsible for IP and spin-offs
- Little promotional activity to entice researchers but very proactive attitude once involved in a project
- The figure of the Business Manager is key, whom becomes the Project Leader
- The university takes a considerable stake in its spin-offs
- Skeptical view on self-sustainability through ownership stakes

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# UNIVERSITY OF OXFORD



The University of Oxford's (UO) ISIS Innovation Ltd was visited on the afternoon of July 31st 2002. Mr. Thomas Hockaday, director of ISIS Innovation, attended the meeting. Additional material for this report has been provided directly by the University of Oxford and the ISIS Innovation Center. Supplemental sources are listed in the bibliography.

## **41. Introduction**

The University of Oxford is Great Britain's most important research university. In 2001, the university accumulated 25 departments rated five stars with 3.000 academic staff and 3.000 postgraduate students working in research (2.024 considered research active staff). An important characteristic to keep in mind is that both the university and the colleges are independent legal entities. For the 2000-2001 year, the University of Oxford secured £208 million (330€ million) research income, £124 million (197€ million) being external research financing and £66 million coming from **HEFCE** (The Higher Education Funding Council for England, which distributes public money for teaching and research in public universities).

Isis Innovation Limited was founded in 1988 to commercialize the research results of those university investigators whose intellectual property belongs to the UO. The following table describes the sources of funding for the period 200-2001. In particular, Isis Innovation can exploit results arising from the first three sources of funding, which identify UO as owner of the intellectual property. In summation, Isis Innovation can manage £161 million (256€ million) of research financing or 77% of all funding.

<b>Source of financing</b>	<b>Amount</b>
High Education (HEFCE)	<b>£66M</b>
UK Charity	<b>£48M</b>
Research Councils	<b>£47M</b>
Industry	£22M
UK Government / NHS	£10M
Overseas Public	£10M
European Commission	£5M

Although during some periods in its history, Isis has received offers to acquire part of its shares, it still remains 100% property of UO. Isis board of directors is made up by two industrialists, a banc director, the university's legal advisor, the university's financial director and 4 professors.

The decision to create an independent company was motivated by the existing culture at that time. In the late 1980's, the business community judged difficult to maintain a fluid communication line with the university environment. Relating to an enterprise was seen easier than maintaining a relationship with a university. Today, the advantages of having a company like Isis are increased flexibility and freedom (for example to set personnel salaries), a *still* better perception by the industrial environment and a better fiscal treatment, although this last issue is not as important.

In one hand, Isis commercializes research results via patents and licensing, on the other via spin-off creation. The approximate figures of this activity are one patent per week, with a current portfolio of over 300, and around 30 companies created since 1998. These spin-offs belong primarily to the two largest academic blocs: Physical Sciences and the Live Sciences.

Although Isis was created in 1988, it wasn't until 1997 that it became active. That year, a new director was employed, Dr. Tim Cook, and the company began expanding until today. Dr. Cook is himself an entrepreneur, having founded **Oxford Asymmetry** in 1992 which is a company devoted to the discovery and development of new drugs. In 1998, UO's stake in Oxford Asymmetry was valued at £11.5 million. It has since then merged with **Evotec Biosystems** to form Evotec OAI.

The "spin-off type of growth" experienced by Isis since 1997 is reflected by the following table:

	1997	1998	1999	2000	2001	2002
<b>Staff</b>	3	9	9	17	21	32
<b>Projects*</b>		168	243	319	415	476
<b>Patents filed</b>		31	51	55	63	82
<b>Licensing agreements</b>	4	8	18	21	36	42
<b>Spin-offs</b>	1	2	3	6	7	8

*\*Projects refer to any technology that can potentially be commercialized.*

The figures from 2002 reveal the selection process that technologies undergo at Isis. In particular, out of 142 disclosures (not in the table) 82 became patents, which generated 42 licenses and 8 new enterprises. As of today, this important commercial activity has not made Isis economically self-sufficient. The university must provide £1 million annually to support its structure. Nevertheless, the university assumes this role without problems. Dr. Tim Cook, Isis Director, believes that at any moment a significant entry of revenue can be secured through the sale of an investment.

#### **42. Internal Organization**

Isis has experimented significant growth since 1997. Consequently this has changed the company culture from a "friends and family" atmosphere where everybody knew each other's responsibilities, to a new organizational structure specialized by functions, where work being done may be less visible to others. Isis has made a significant effort in evaluation, organization and action. In 2001, it received the national Investors in People UK standard prize. Isis is currently organized in four departments:

Administration (8)	Physical Science (9)	Life Science (11)	Business Innovation (4)
<u>Managing Director</u>	<u>Head of Group</u>	<u>Head of Group</u>	<u>Head of Group</u>
Dr. Tim Cook	Dr. David Baghurst	Linda Naylor	Dr. Mark Taylor
<u>Executive Director</u>	<u>Project Managers</u>	<u>Project Managers</u>	<u>Project Managers</u>
Tom Hockaday	Dr. Rober Adams	Dr. Dave Brennand	Gill Rowe
<u>Lawyer</u>	Dr. Herb Askew	Dr. Aarti Chapman	tba
Christine Beuermann	Dr. David Eastham	Dr. James Hamilton	<u>Marketing Administrator</u>
<u>Administrator</u>	Dr. Amanda Nolte	Dr. Angela Kukula	Jo Abbott
Gill Nash	Jasmine Pandher	Dr. Taj Mattu	
<u>Facilities Admin.</u>	Dr. Mairi Raggatt	Dr. Richard Middleton	
Jane Tarry	<u>Marketing Administrator</u>	Dr. David Phillips	
<u>Admin. Assistant</u>	Kim Hole	<u>Marketing Administrators</u>	
Naz Khan	<u>Assistnat</u>	William Bartrip	
<u>Accounts Assistant</u>	tba	Jo Fyson	
Laura Keane		<u>Assistant</u>	
<u>Marketing</u>		Debbie Small	
Jennifer Johnson			

The Business Innovation and Consulting unit was created recently to strengthen the commercial activity and the universities link with industry. It is a consultancy practice focusing on the fields of humanities and social sciences. Half of UO's activity relates to these fields. Certain UK universities don't establish limits to the consulting activities that professors carry on. In UO's case, the policy establishes a limit of 30 days a year. The Business Innovation and Consulting unit manages contracts and tries to expand this line of technology transfer.

Additionally there are a number of other organizations which provide support relating to innovation. Those most closely linked with Isis activity are the following:

1. **Isis Angels Network (IAN)** is a non-profit organization created in 1999 which brings together private investors willing to invest in spin-offs of the university. The members of this network may also intervene and collaborate in some projects, acting primarily as non-executive directors on the board of the company.
2. **The Oxford University Challenge Seed Fund (UCSF)** is one of the 15 seed funds subsidized by the government at the end of the 90's. The purpose of them is to close the financial gap existent between a promising research projects and a technology that has demonstrated commercial value. UO's challenge fund has secured £4 million. The UCSF's **Investment Advisory Committee (IAC)** which meets three times a year evaluates the proposals. Financial assistance is only available to companies prior to constitution. Also, if a director is incorporated he or she will have to work with the Isis project manager assigned to the project.
3. **Isis College Fund** is another fund destined to provide financing at and past 2<sup>nd</sup> rounds. UO invested £1 million and a number of colleges added £9.7 million.
4. **The Oxford Innovation Society**, funded in 1990, allows some companies (50 at the moment) to have privileged access to the research results of Isis projects. In a sense, it allows society members a first look at a new patent, although this does not imply first refusal rights. The society organizes seminars and dinners where the research projects present their findings.
5. **Research Services Office** is UO's unit that manages all sponsored research.
6. **VentureFest** is Oxford's International Fair for Entrepreneurs.

Other organizations less closely related to Isis are the **Business Liaison Unit**, which acts as the entryway for companies into the university, **Oxford Consulting**, which is the gateway for the professional services that research groups offer to industry, **Oxford Entrepreneurs**, promoted by UO, the Said Business School and the government, and finally the **Begbroke Business and Science Park** with its incubator.

### **43. Creating New Companies at the University of Göteborg**

#### **BB. Promotion of the entrepreneurial culture**

Isis' work philosophy is based on maintaining a double attitude in front of researchers. Firstly, Isis does not pressure investigators into commercializing their research findings. In fact, Isis does communicate transparently the problems and difficulties found in creating a spin-off. What Isis tries to do is to make a lot of noise within the university community by organizing a large number of seminars, conferences, etc. It then waits for the investigator to take initiative and approach Isis. Isis director says that a first indication of real interest is when a researcher asks for a meeting at Isis, which is located at a certain distance from the university campus.

Secondly, once the investigator has taken the first step and its proposal has been accepted Isis will then go out of its way, introducing a certain level of tension and being demanding with the entrepreneur. In fact, Isis's director says that "Isis makes the process happen"

Isis considers that initially having a neutral policy on trying to promote the entrepreneurial culture is positive. In a sense, Isis does not want to get involved in having to "hunt down" investigators, which would not be a good sign of their motivation level. In short, Isis does inform and communicate the services and opportunities available to researchers through commercialization. Nevertheless, it does not try to modify behavior that may go against nature.

#### **CC. Selection of spin-off projects**

The policy just described has an impact in the selection process of spin-off projects. In fact, it may be an important contributing factor to the impressive results obtained at Isis (All spin-offs created since 1997 continue to operate today). Isis entrepreneurs will go through two essential selection processes; one being the initial one managed by Isis personnel and a second one by the board of directors of the university which will rate the business plan and decide on the final authorization. (a third selection process is possible if UO's Challenge Fund is involved)

While the selection process was not explicitly discussed during our meeting some general opinions were given. Particularly, Isis staff believes that the researcher is the most important figure in the project. This, to a certain extent, goes against the common belief that management is the essential element. Also, Isis will only take projects based on investigation, all other projects are channeled to the Innovation Center.

#### **DD. Support and management of start-ups**

The key figure in Isis' structure is the project manager. This professional has a profile based upon two essential characteristics: an understanding of research (being a Doctor is a prerequisite) and understanding the commercialization process of technology (experience in industry is another prerequisite). Although, the salaries that Isis can offer are not in line with industry, Isis is able to find good project managers. This, in part, is due to the fact that this line of work is quite complex and exposes people to a large number of business problems. Therefore, the posts offer a valuable, accelerated learning experience.

Each project manager is assigned a spin-off project and works very close with the entrepreneurs. This may lead to some of them joining the new firms as directors, leaving Isis. Project managers tend to stay at Isis between two and five years, two being the minimum time necessary for adequate training. Isis does not view this trend as a thread and actually considers it positive for the spin-offs. Sometimes, a partial dedication arrangement is established for some project managers.

Each project manager is responsible for up to 40 "projects" (A project being defined as a technology that can be commercialized via patent or spin-off). While this is a high number, only 5 to 10 projects do typically require a significant dedication.

Isis follows a set of steps in all projects it internalizes. As explained, Isis involvement begins with a disclosure of invention and the researcher filling a questionnaire. After, Isis gets in touch with the University's Research Services Office to find out if it holds the intellectual property rights over the line of research that originated the new technology. If this is the case, the university will transfer them to Isis, whom will then focus on protecting the technology. Additionally, the researchers must also obtain an authorization from the Head of Department, the Faculty Board, the General Board's Committee or the Conflict of Interest Committee. Isis helps entrepreneurs obtain this authorization, whose aim is to avoid precisely a conflict of interest. After this, together with the project manager and other external consultants involved, the business plan is written. At this point, the share distribution arrangements begin to be negotiated. The project manager will present both the business plan and the ownership distribution to Isis' Board of directors. Sometimes the board may ask for changes. If the authorization is given, the spin-off can be created. At this point, Isis licenses the technology to the new company.

Isis requires a royalty sharing scheme in addition to the ownership stake it takes in exchange for the other services being supplied. Nevertheless, the license conditions are very accommodating, taking into account the lack of liquidity of these companies for the first few years. Therefore, Isis tries to diversify its investments in spin-offs by having a royalty on sales and ownership in the company. In this way, independently of its ownership position the university will maintain a return on its investment. Other investors tend to criticize this policy as it seems to provide a disproportionately large share of returns to UO. Nevertheless, Isis says there are no plans to change it.

In relation specifically to ownership participation, Isis expects "to be a significant holder in the spin-out company". Isis justifies its high ownership arrangements taking into account 3 elements: the resources that the university devotes to the projects, the special authorizations that grants to these companies and the value that their association with the university represents to them. Initial negotiations begin at a 50% -50%

proportion. If no agreement is reached between Isis and the entrepreneurs the Intellectual Advisory Group steps in to try to settle the matter. According to Isis, when an investor joins the project, the ideal situation is an equal distribution between the three parts. Isis looks for this outcome in distribution:

30% University of Oxford  
30% Researchers  
30% Investors  
10% Management

As seen, Isis does provide help in many of the activities needed by the spin-off. It helps writing the business plan, looks for investors, takes part in negotiations, finds a director for the new company (they don't allow an investigator to be the director) and also supplies external services such as lawyers or accountants. In reference to the role of the investigator, Isis and Oxford's strategy is based on the expectation of having the head of the research group responsible for the new technology stay at the university. This way, "the university does not lose a good scientist and the company does not gain a bad manager". Furthermore, the same investigator can initiate several spin-off projects. Isis does nevertheless promote that a senior scientist joins the company as research director.

Finding facilities is not an issue for Isis. Fortunately, the Oxford area is home to a large offer of private incubators. The entrepreneurs can decide which one they want to move into. Isis does not consider facilities management to be a differential element of their competencies.

Finally, It is clear that the University of Oxford leverages on its reputation for research excellence at many levels. The spin-off field is no exception. For example, UO has reached an agreement with **Beeson Gregory**, an investment bank, for which the bank will finance £20 million (of a £60 million project) to build new research facility for the chemistry department. In exchange, the university will give the bank half of UO's share (Isis) in all spin-offs arising from this center in the next 15 years. This is an interesting way of securing a steady flow of revenues for an entrepreneurship center, a major problem of this industry where large fluctuations and long periods without income can endanger a project (especially during the first years). Obviously, you have to have the credibility and reputation that Oxford has to be able to command a deal of this nature (and these amounts).

#### **44. Concluding Remarks and Initial Assessment**

Too many points can be brought up in this section but it wouldn't then be a summary. The most important elements that identify the "Isis model", if it can be called this way, are:

- Spectacular growth of Isis under a champion, although surprising to find no spin-off activity prior to 1997 given the research resources of this institution
- Little promotional activity
- The key figure of the project manager and close involvement in the spin-offs
- UO avoids weakening its research structure by discouraging top scientists to leave the institution

- Isis leverages on Oxford's reputation at many levels (high ownership participation and sale of future spin-offs)
- Current effort to generate spin-off activity in humanities and social sciences

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- Oxford Consulting (<http://www.oxconsulting.co.uk/>)
- HEFCE (<http://www.hefce.ac.uk/>)
- Begbroke Business and Science Park (<http://www.begbroke.ox.ac.uk/>)
- Evotec AOI (<http://www.evotec.com/>)
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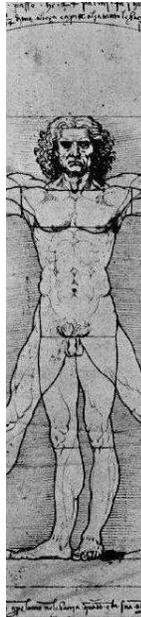
K. U. Leuven (KUL) was not visited during our best practices study. Nevertheless, Mr. Edwin Zimmermann, Innovation Advisor from the Research and Development Office at KUL, gave a presentation on June 13<sup>th</sup> 2002 at the II National Congress of Academic Spin-offs in Santiago de Compostela, Spain. We were present at this congress and we had the opportunity to see his presentation. Additional material has been provided directly by K. U. Leuven. Supplemental sources are listed in the bibliography. This report does not follow the same structure as the others. It is a straight discussion about those factors that, in our opinion, bring additional light into how a spin-off support unit should operate. Our analysis has been reviewed by Mr. Zimmermann.

### **Description and analysis of K. U. Leuven**

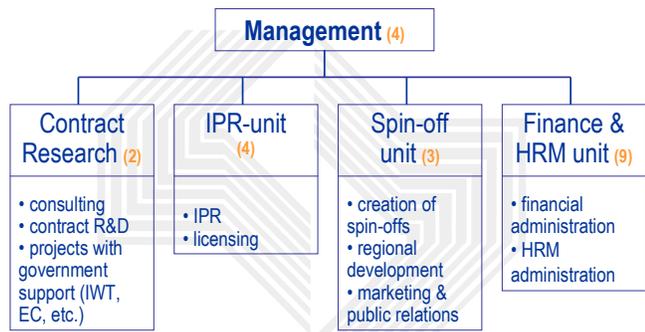
The inclusion of the K.U. Leuven experience was not planned. Nevertheless, we felt they had summarized some key points in spin-off management so successfully that it would be a major opportunity loss not to include them. Their model is very straight forward and full of common sense, which may be the reason why it has proved so successful. The results are indeed impressive. KUL has generated over 45 spin-offs companies with a total turnover of 350€ million and over 2.000 new jobs created. Additionally, there are many intangibles that these figures will not measure such as the impact on the local economy and the research contractual activity that these new companies have brought to KUL. They are one of the few European Universities that “have gone all the way” by floating the shares of one of its spin-offs in a publicly traded market.

Obviously, these are long-term results and one cannot expect to achieve them in the short-term. KUL has been supporting academic spin-offs since the mid 70's. Also, to put things in perspective, KUL has done so with an annual applied research budget (year 2000) of 165€ million, a student body of 26.000 and 3.500 researchers. KUL also benefits from having its own University Hospital boasting a staff of 7.000.

The Research and Development office is the unit that manages spin-off support. It is made up of 22 people, divided in the four following specialty areas (as typical of most TTO's):



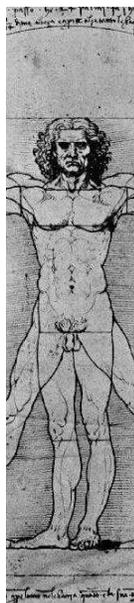
## K.U.Leuven R&D: Organisation



- Close interaction & cross-over between units
- Regional & international networking

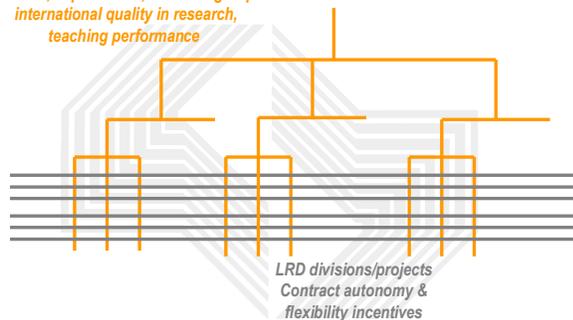
As seen, there are only 3 people that provide support to spin-offs, including marketing and public relations activities. Nevertheless, KUL maximizes the potential of the whole structure by promoting close interaction between the different areas of the R&D office. Finally, it is important to point out that KUL's Research and Development Office (LRD) is a separate legal entity within the university, allowing for a large degree of freedom in its budget and human resources management.

Another interesting fact about KUL is its organizational approach that links all of the different faculties, departments, research groups, etc, together with LRD. The goal is to achieve a balance between scientific excellence and generation of innovation and applicable technologies. The organizational structure is complex with horizontal and vertical relationships. KUL's organizational diagram follows:



## CONTEXT: Organisational approach

*Faculties, departments, research groups:  
international quality in research,  
teaching performance*



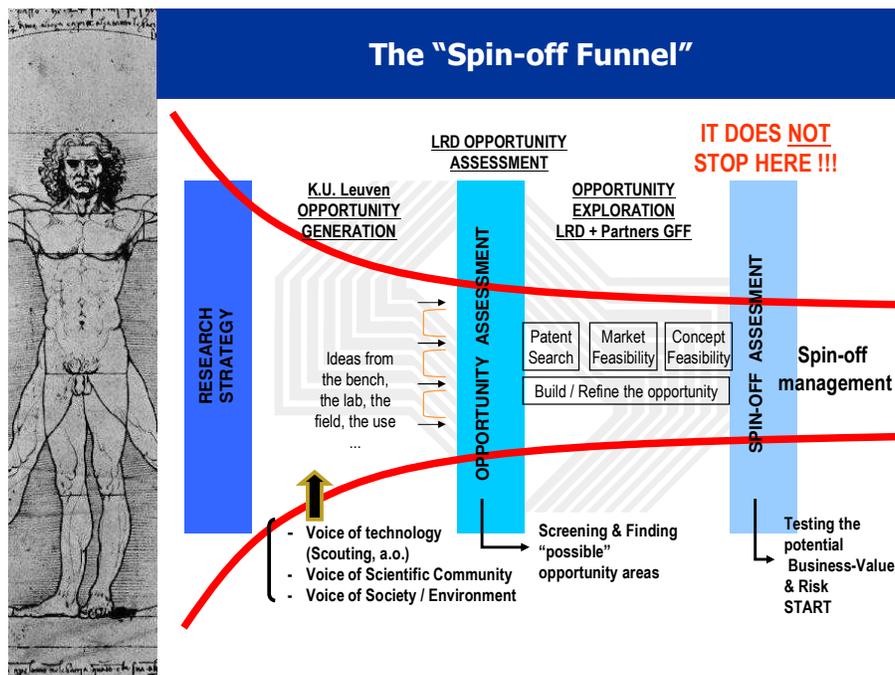
⇒ Dual incentive mechanism to maintain a balance and healthy tension between striving for scientific excellence and gearing this excellence towards application and innovation.

In the networking area, KUL has as well developed vertical and horizontal relationships with a number of organizations. Most importantly is **Leuven Inc.**, a network organization that defines itself as “bringing together like-minded people” from the academic research world, high-tech startups, support actors and local venture capitalists. An example of a vertical relationship would be **DSP Valley**, a technology cluster that focuses on the design of hardware and software for digital processing systems.

Going into greater detail about how LRD operates, its model follows four differentiated stages:

1. Idea generation
2. Business plan management
3. Coaching of entrepreneurs
4. Managing of the spin-offs

This chronology is similar to the one seen in many centers but it’s a bit more detailed, having a very clearly defined goal for each stage. During the first stage, the goal is “addressing and assessing feasibility and economic potential”. If the project seems promising, a full business plan is produced incorporating constant feedback from LRD to refine it until it is ready for approval. After this, LRD focuses on training the entrepreneurs in business management and other aspects relating to launching a new company. Finally, LRD assigns one of its project managers to act as a “quasi-executive director”. Like in other centers visited, having a support staff on board until the company is developed enough to justify a full-time manager is viewed as a key contribution to the success of its spin-off. Furthermore, LRD reinforces the importance of providing this service for free. The following graph summarizes the so-called “spin-off funnel implemented at K.U. Leuven:



In general, there are a number of recommendations worth mentioning coming from LRD’s experience. Firstly, understanding that spin-off management requires a difficult

balance between hands-holding and spin-off autonomy, or as they put it “hands-on and hands-off”. In other words, too much support may prove detrimental once the company is on its own in the marketplace. On the other hand, too little support may jeopardize the project altogether. This balancing act has a lot to do with the internal capabilities of the entrepreneurial team and its degree of motivation and commitment with the initiative.

Another interesting point that was not discussed in any other center was having a clear focus on financial performance. While at Chalmers Innovation the focus is on ‘time-to-market’, at KUL the focus is on getting to break-even as soon as possible. This implies that the project is viewed as an investment with a *perishable* opportunity window that is given by the initial financing and support provided. Additionally, LRD finds very important to “develop both ‘focus’ as well as ‘complementary activities’ early in the company’s life cycle”. This issue may be a bit more controversial as some spin-off professionals believe that a new company cannot afford to overextend itself so early on, and could lose focus. Another interpretation may be that a successful spin-off needs to be more than a single product or technology; that it needs to have the internal capacity to generate innovation and be flexible enough to adapt, both strategy and product offerings, to a changing environment.

Finally, another major rule of thumb for LRD is “finding the ‘right’ product-market combination. This implies that technology by itself is not enough. It means that tapping into a market and customization of an offering is crucial. An opportunity is not a technology or a niche market but a combination of these two elements.

Overall, the LRD experience is very revealing because it brings forward how much of a balancing act spin-off support is. There seems to be a reoccurring concept throughout the way KUL operates (technology/product vs. market, hands-on vs. hands-off, focus vs. diversification, separate legal entity vs. vertical and horizontal networks, confidentiality vs. right of publication). There isn’t necessarily a right or wrong choice but it is the degree to which these policies are implemented one way or another that make them successful (in conjunction with timing and a case-by-case analysis).

# **ZERNIKE GROUP**



The Zernike Group (ZG) was not visited during our best practices study. Nevertheless, Mr. Eri Vázquez, Project Manager at ZG, gave a presentation on June 13<sup>th</sup> 2002 at the II National Congress of Academic Spin-offs in Santiago de Compostela, Spain. We were present at this congress and we had the opportunity to see his presentation. Additional material for this report has been provided directly by the Zernike Group. Supplemental sources are listed in the bibliography. This report does not follow the same structure as the others. It is a simple enumeration of those factors that, in our opinion, bring additional light into how a spin-off support unit should operate. Our analysis has been reviewed by Mr. Vázquez.

## **Description and analysis of the Zernike Group**

The experience of the Zernike Group is interesting for a variety of reasons but mainly because it is a private technology transfer company that specializes in commercialization of research result from universities and other research institutions. In short, Zernike is in the business of absorbing the outsourcing of technology transfer by these institutions, and trying to achieve a return on investment. While ultimately generating an income is everybody's objective, in the private sector the meaning is more chrematistic and short-term oriented. This has significant implications in how the process is approached and Zernike has organized itself.

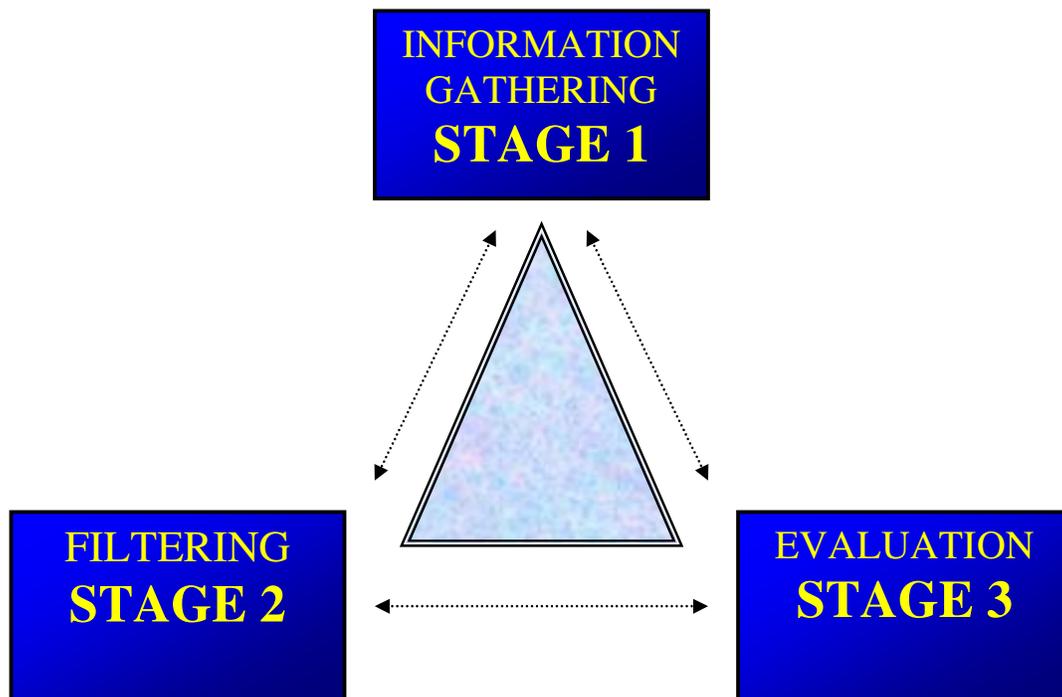
The Zernike Group has a long-standing record, a very good one, which has allowed them to reach conclusions only accessible to the few that have evaluated and managed hundreds, if not thousands, of potential spin-off projects. This experience is very valuable. With this accumulation of knowledge, the Zernike Group has developed a work methodology that can only be described as the most clearly defined and structured of all the centers we have visited. This process has been fine-tuned over the years with significant changes that sometimes have broken pre-established thinking about the importance of some variables over others, as well as, about the chronology of the evaluation and management process of spin-offs.

Finally, The Zernike Group is a full-fledged technology transfer company dealing with spin-offs, patents, having its own venture capital funds and even managing incubators and scientific parks. The results are impressive by any means. Zernike has created 350 new companies in its 10 year existence. Its funds yield a 12% return at a time when the average venture capital fund in Europe is only returning 4%.

One of the key success factors of Zernike is the agreements they have reached with research institutions and universities. It is evident that if one has a significant dealflow, which on top is in a relative position of monopoly, good projects are bound to appear by sheer statistics. This could be viewed as a justification of Zernike's success on its size, instead of its process. In our opinion, this is simply smart business management, which

does have a significant impact of the final success of the company. Nevertheless, the filtering process and management of spin-offs at Zernike is also critical, and an important contributor to overall success.

One of the things that make Zernike interesting is its conceptual understanding the evaluation process. This area is seldomly discussed or planned at many places. When providing support at potential future spin-off, many professionals do not think about where do the tasks they are performing belong. In other words, one may find him or herself looking for supplier or financing for the spin-off before having reached a final decision on the viability of the project. In a way, this could be thought of as some sort of mismanagement of resources. In contrast, Zernike follows a strict three step process during the evaluation of a project.



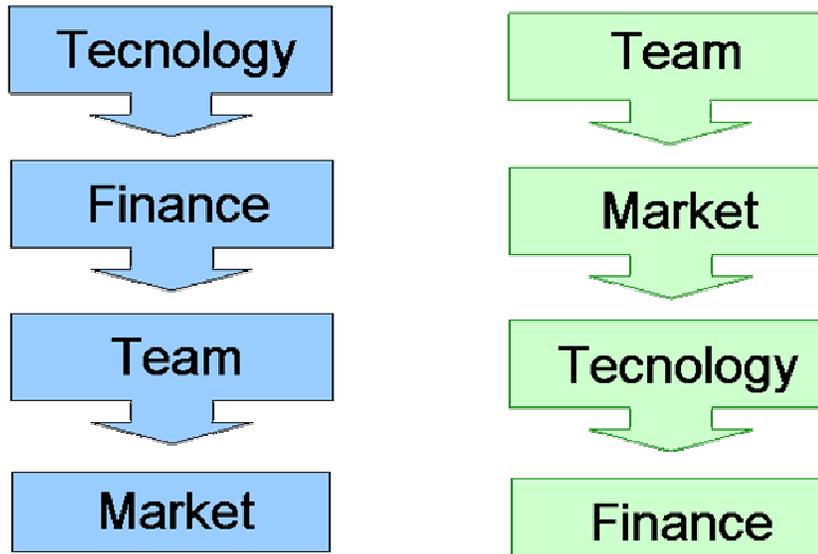
They begin with a stage described as information gathering, where the necessary data about the project is compiled. The level of detail sought after is high. They establish a direct communication line with the entrepreneurs. An important part of this stage focuses on IP, confidentiality and commercial aspects. Additionally, Zernike assigns an independent external evaluator to each project.

The second step consist in an automated filtering process that responds to statistical data gathered over the years about why some projects are successful and profitable and why some others are not. Some of the variables utilized are date of constitution, industry, sales volume, requirements to implement the project, value of the technology or an assessment of the entrepreneurial skills of the founders. Finally, if the project makes it through to the final stage it is then re-evaluated in depth following a specific chronology of the four variables deemed most critical, as seen in the next diagram:

# STAGE 3

## Initial Order      Actual Order

---



As seen, the left hand side column depicts the initial order that Zernike used to implement. Over the year, it has changed to the one on the left hand side, after assessing the experience accumulated with hundreds of projects. These variables are in fact universal. Nevertheless, the order of importance is (and will be) a hotly debated issue. It is the quintessential question about which variable is the “wholly grail” that can determine future success. In general, the team is most commonly accepted as being the most determinant variable. Nevertheless, some industry professionals like to focus on the market or the technology ahead of the team. In any case, considering a single variable as the key to a project is an erroneous hypothesis, as all of them are essential. In our modest opinion, its individual importance is to a great extend determined by the singularity of each project.

The software application that Zernike has developed to filter projects is simple but quite powerful. Looking at it, one realizes that the work methodology may be similar to the one applied at banking institutions in relation to commercial or retail credits. It is a standardized process, which goal is to eliminate hazardous or non-viable projects. The objective is not necessarily to pick winners, as the final decision is taken in a typical committee structure. Therefore, it is an additional tool that goes into the final decision making process and that also translates into time and resources savings during the evaluation process. Notice that the system is build to match each project with the most appropriate Zernike venture capital fund.

**Screening criteria:**

- Enterprises existence less than 3.5 years
- Innovativeness conform S and O criteria
- Inhouse manufacturing
- Turnover within the coming year
- Enterprise will be NL based for the next 5 years
- Enterprise is not part of an existing holding
- Enterprise will be based in the required region
- Businessplan available
- Resumé entrepreneur
- Main activity of the enterprise is in the required technical field
- Selling rights and product prices in writing
- Co-funding equals investment

**Funds:**

- TIFAN ———— ■
- Bio Parner ———— ■
- HT-Ventures ———— ■
- ZIF ———— ■
- Rabobank ———— ■
- SIMKBIJ ———— ■
- ROF ———— ■
- Den Helder ———— ■
- UTS ———— ■

The final screen picture shows how each major category is evaluated. Each tab responds to a distinct area within the major category (in this case Market). Zernike not only rates in a standardized and comparable manner these variables, but it also takes into account such matters as the amount of research done on each issue (little, medium or in depth), the date of the assessment, or comments by the evaluator. With all of this, Zernike tries to assess the *quality of the evaluator's assessment*, and therefore the probability of it being correct. In other words, if an evaluator has given an opinion on a subject with little background and research made, then this opinion is given much less value in the final project rating than if the conditions were the opposite. Furthermore, the screen makes also clear that the final evaluation process is then supervised by an independent controller that checks the whole process to ensure quality one final time.

**Market** Evaluator; Controller:

Comparables | Market accessibility | Market size | Customer | Macro influences | Price sensitivity | Criteria summary

**Comparables**

- Identical products
- Substitute functionality
- Competitive advantages
- Level of market penetration by substitutes
- Price comparison
- Market pricing strategies

Leading evaluator:  
 Value: None  
 Research:   
 Date:  / /   
 Attach document  
 Remove document  
 Disable assesment item  
 Block further assesment

Quality controller:  
 Value: None  
 Research:   
 Date:  / /   
 Attach document  
 Remove document  
 Disable assesment item  
 block further assesment

Comments of evaluator  
 Open

Comments of controller  
 Open

While a process like this may be relatively impractical to implement at a typical university TTO, it is at least interesting to see and understand. It may not guarantee

future successes but it probably avoids making costly mistakes in some undesirable investments.

Software applications to support decision-making are another topic where opinions are divided. Can the process of spin-off creation be structured and standardized to such an extent successfully? Is it superior to a more traditional and flexible process of meetings and making decisions based on key personnel experience? The only reference we could think of is the credit risk process of financial institutions. In this case, risk is assessed quite successfully taking into account a variety of tangible and intangible variables (like with spin-offs). Nevertheless, one could say that they are oppositely positioned in a risk curve. Spin-off creation is an extremely complex and high risk undertaking. This is a significant difference that may demand a much more detailed and in-depth analysis of a situation, which may not be easily simulated by a software application.

In any case, Zernike represents a viable way of organizing a technology transfer company. Its system has worked well for them, but it may not necessarily be transferable everywhere. Nevertheless, it provides an interesting contrast between how a private company operates in comparison to how university-based support units typically do so.