The new face of entrepreneurship in Korea
ChemTech Research Inc

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The new face of entrepreneurship in Korea: Chem-Tech Research Inc.
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Abstract

Chem-Tech Research Inc (C-TRI) is a life science venture company established by a group of six Korean scientists in April 1998. The entrepreneurial spirit behind the venture, and the CEO and President of the company, is one of Korea’s most distinguished pharmaceutical chemists, Professor Wan-Joo Kim. C-TRI expects to go public with an IPO in April 2001 on Korea’s new venture Board, KOSDAQ, ie three years after the company’s founding. It is undoubtedly one of the most interesting of a new crop of knowledge-intensive, R&D-based venture firms founded in the post-crisis Korean industrial renaissance. This case analyzes the emergence of C-TRI and its development of short-term, medium-term and long-term business models. The case identifies the fundamental resources, routines and interfirm relations utilized by C-TRI to become a player in the global biotechnology industry.

Keywords: C-TRI; Chem-Tech Research Inc; Entrepreneurship; Korea; biotechnology; chirotechnology; human protein expression; pharmaceuticals

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The new face of entrepreneurship in Korea  
ChemTech Research Inc

1. Introduction

Chem-Tech Research Inc (C-TRI) is a life science venture company established by a group of six Korean scientists in April 1998. The entrepreneurial spirit behind the venture, and the CEO and President of the company, is one of Korea’s most distinguished pharmaceutical chemists, Professor Wan-Joo Kim, a member of the Korean Academy of Science and Technology, a professor at Suwon University, and recipient of numerous prizes in Korea. He has led C-TRI to become a revenue earner in the space of less than two years, in such areas as fine chemicals and pharmaceuticals, while adopting a longer perspective with several R&D projects that promise to be world firsts in biotechnologies if brought to fruition. C-TRI expects to go public with an IPO in April 2001 on Korea’s new venture Board, KOSDAQ, ie three years after the company’s founding. It is undoubtedly one of the most interesting of a new crop of knowledge-intensive, R&D-based venture firms founded in the post-crisis Korean industrial renaissance.

Specifically in the context of Korea, with its pre-crisis tradition of large firms investing in known technologies at massive scale of production, C-TRI is of great interest in that:

• It is an entrepreneurial venture which carefully manages risk so that there is a short-term group of products based on known technology, generating immediate cash flow, and medium- and long-term R&D programs generating new and more speculative products;
• It is a venture created and managed by scientifically specialized people, rather than by general managers;
• It is a venture based on equity capital rather than debt financing; and
• It is R&D-oriented rather than production and sales oriented, with much of its early capital being expended on establishing a new product range;
• It is alive to domestic business opportunities while reaching out to the world through strategic alliances and creation of a new German subsidiary within two years of its founding.

2. The company founder, Wan-Joo Kim

Dr Wan-Joo Kim is highly unusual in Korean business circles in that he is a scientist and maintains a full professorship while acting as CEO of his venture firm. He spent most of his working life in the government research laboratories, both the Korean Institute for Science and Technology (KIST), where he was a Division Director in Applied Organic Chemistry (1977-1985), and in the Korean Research Institute for Chemical Technology (KRICT) where he held a similar position (1987-1995). Earlier he obtained a PhD from the University of Hamburg in Germany. In his present role at C-TRI he has fostered excellent links with Germany, and indeed has established a new company, C-TRI Deutschland GmbH. He was for a short time a full
professor in the College of Pharmacy at Sung Kyun Kwan University, and returned in 2000 to holding a chair at Suwon University.

Dr Kim was drawn increasingly to areas where biology interfaces with chemistry in the 1990s, and became convinced that it would be possible to start a firm producing world-class products from this conjunction (which he calls, in his own verbal creation, “chemiology” – meaning life products produced through chemical processes based on natural sources). But before launching himself into such a business venture, Dr Kim realized that he would first need some business experience and circle of business contacts. So in 1995, at the age of 54, he moved to the private sector and took a job as R&D Director for the Korean firm Hanmi Pharmaceuticals. He was quickly elevated to be made CEO of a spinoff firm, Hanmi Fine Chemicals, where his knowledge of advanced fine chemical technology was put to good use. He served four years as salaried CEO of this company, learning the routines of management and building a circle of business contacts that would be needed when he started his own company.

In 1998 Dr Kim and five of his former colleagues from KRICT felt that it was time to launch their own venture. It was during the worst phase of the Asian financial crisis in Korea, so it was truly an act of faith to start a new business. There was no capital available for investment at that time, so the founders put up all the initial capital themselves, mortgaging or selling their private homes to do so. At the age of 57, with a full scientific career behind him, Dr Kim ventured into the entirely new waters of entrepreneurship, putting his life savings on the line to prove that he could do it. To his credit, he took no resources or business customers from Hanmi Fine Chemicals when he left; it was to be an entirely fresh start.

3. The business vision for C-TRI

Dr Kim and his coworkers saw themselves creating a company which would specialize in two fields initially, namely the production of optical isomer materials utilizing chirotechnology, and the production of human protein from chicken eggs – such as antibody proteins (immunoglobulin). Both fields promised immediate revenue-earning opportunities from proven technologies and business models, while promising longer term payoffs through leading-edge research programs. Ultimately the vision of the company is one concerned with the production of human proteins through advanced chemical and biological processes. Chirotechnological separation techniques applied to the production of a range of pharmaceuticals is one such area. Use of genetic engineering, or transgenic techniques, in chickens, through inserting human protein synthesizing genes in the chicken genome, is another; it involves capturing the expressed proteins (such as immunoglobulins, or erythropoietin, or any of hundreds of other proteins with pharmaceutical and medical applications) in the chicken eggs. This is a method superior to existing systems for growing human proteins in animals, such as rabbits, goats or horses, and collecting them as serum from blood. Thus C-TRI takes its place beside a handful of world leading companies pioneering this kind of biotechnology.

C-TRI's business vision is carefully framed to span short-term revenue-generating businesses, medium-term projects that add R&D to existing business lines, and longer-term projects that are entirely R&D based, and depend on speculative technologies such as transgenic methods. Almost all the initial capital of the company was sunk into R&D to produce the initial short-term business lines. Around 50% of R&D was expended in short-term projects that could generate immediate payoff;
around 30% in medium-term projects (two to three years); and around 20% in longer-term projects (three to five years) with more speculative payoff. This makes C-TRI highly unusual amongst Korean firms, where new ventures have traditionally been started by existing conglomerates for purposes of production, rather than research.

4. Early activities

Dr Kim and his co-workers did not start the company with an existing product range taken from their earlier employers (Hanmi and KRICT) but with an entirely new set of products and services based on their existing knowledge and with a series of research contracts with other organizations. These latter provided much-needed initial cash flow.

Initial capital was sunk into establishing a state-of-the-art R&D facility, at Myongji University, where the founders had good existing relations. In the first year, efforts were poured into developing a range of pharmaceutical products based on known technologies for which there was a market in Korea but no domestic production, i.e. a sophisticated import substitution strategy. This was backed by research contracts with public agencies, such as the Small and Medium Business Administration, and with the private sector, such as Korea Drug Company.

An unexpected opportunity arose in the company’s second year to purchase advanced production facilities for pharmaceuticals and fine chemicals. By chance, the German firm Bayer A.G. was looking to sell off its pharmaceuticals production facilities in Korea in the year 1999 (maintaining its other sales operations) and this provided a quite unexpected opportunity for C-TRI. An offer was made to purchase the Bayer facilities at Nam Yang Ju, further private investment was sought, and a deal was closed. C-TRI thus acquired state-of-the-art production facilities for fine chemicals and pharmaceuticals together with a skilled workforce, that would have taken years to acquire through other routes. This plant has been used for production of C-TRI’s high value chiral material, and for the raw materials needed for production of pharmaceuticals like asymmetric ketoprofene.

Further development and growth of C-TRI has seen it relocate and re-establish its R&D facilities as the Central Research Institute, now located at Suwon University in Korea. (The university is also an equity investor in C-TRI). In 2001 C-TRI has also established an R&D Center in Germany, in the Bio Park of Regensburg University, where Dr Kim already has strong academic links with colleagues in the Institute of Pharmacy and Organic Chemistry.

Financing

Initial capital for the venture was raised exclusively from the six cofounders, mainly from Dr Kim who sold his own home to raise initial capital. Thus there was no large company capital behind the venture, or venture capital (VC), or loans from a bank. This is an all-too common method of founding new, knowledge-based ventures.

A year after the founding of C-TRI, business activity started to pick up in Korea, and some investment funds started to flow. The company was registered in Korea as a “venture company” which had the dual effect of providing for favorable taxation treatment, and lending the firm legitimacy in the eyes of potential investors. A number of VC firms became interested in C-TRI, on account of its long-term growth potential, and the soundness of its leadership and management. Larger
investment funds such as Hyundai Venture Capital (HDVC) also became interested, as well as Korea’s largest bank, the Kookmin Bank.

To attract private investment placements, Dr Kim had to make a series of investor relations (IR) presentations, either on his own or in conjunction with one of the VC backers. In this way, C-TRI was inducted into the rarefied world of high investment and finance.

In early 2001, prior to the planned IPO, the major shareholdings in C-TRI were as follows.

<table>
<thead>
<tr>
<th>Shareholder</th>
<th>Shares</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr W.J. Kim</td>
<td>1,674,820</td>
<td>23.76%</td>
</tr>
<tr>
<td>Other founders</td>
<td>511,300</td>
<td>7.25%</td>
</tr>
<tr>
<td>Dae Yang E&amp;C Corp</td>
<td>740,370</td>
<td>10.50%</td>
</tr>
<tr>
<td>VC firms</td>
<td>1,860,120</td>
<td>26.38%</td>
</tr>
<tr>
<td>Hansul Chemiense</td>
<td>434,360</td>
<td>6.16%</td>
</tr>
<tr>
<td>Hyundai Biotech Fund</td>
<td>100,000</td>
<td>1.42%</td>
</tr>
<tr>
<td>Suwon University</td>
<td>120,000</td>
<td>1.70%</td>
</tr>
<tr>
<td>Shin Han Bank</td>
<td>200,000</td>
<td>2.84%</td>
</tr>
<tr>
<td>Others (incl employees)</td>
<td>1,138,630</td>
<td>11.90%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,050,000</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

It is notable that C-TRI never sought bank financing in the form of loans, making it highly unusual in the context of Korea, where high debt-equity ratios were common for the chaebol. These are generally regarded as having been partially responsible for the onset of the Korean financial crisis in 1997. Thus C-TRI’s avoidance of debt makes it firmly a “post-crisis” company.

5. **Short-term businesses**

C-TRI’s first sales revenues were generated in January 2000, ie 16 months after the company’s founding in April 1998. This is a fast rate of converting initial knowledge assets into a revenue-generating business.

**High-value raw materials for pharmaceuticals**

C-TRI’s production facilities at Nam Yang Ju have been put to immediate and good use for production of fine chemicals utilized as intermediates in the pharmaceutical industry. The focus has been on chemicals needed in Korea but currently imported. This strategy has the double advantage that it generates cash flow, and avoids problems of intellectual property (IP) protection. For example, the plant is producing sophisticated chiral chemicals (see below) through asymmetric synthesis using organometals or enzymes.

**OTC pharmaceuticals**

Initial pharmaceutical production has focused on Over the Counter (OTC) products, partly because these tend to be generic (thus avoiding issues of intellectual property protection) and partly because they do not pose the same regulatory hurdles as ethical pharmaceuticals. The focus of these initial products has been on mild therapies that do not have to include use of antibiotics.
**Contract R&D**

C-TRI has also been able to earn revenues, and build useful relationships, through offering its unique knowledge base and advanced R&D laboratories for the conduct of contract R&D. In the first two years, such R&D contracts included those undertaken with Korea’s Small and Medium Business Administration (technical innovation development); the Korea Drug Company; and large Korean companies like Hansul Chemiense which is the largest paper company in Korea. Hansul is diversifying into pharmaceuticals and is co-developing with C-TRI new drugs such as Taxol.

6. **Medium-term businesses**

C-TRI’s medium-term businesses depend on adding value through R&D to known or existing technologies. These have focused initially on two areas, namely chirotechnology, and production of human antibodies through the use of antigen-dosed chickens. In both cases, C-TRI is blazing a trail without peer in Korea, and takes its place alongside some of the most respected names in the world pharmaceutical and biotechnology industries.

**Chirotechnology business**

Chirotechnology is a new business area that has emerged in the past decade, based on the capacity to separate left- and right-optical isomers in biological preparations. These left and right isomers, discovered by Pasteur in the 19th century, are now known to have quite different biological effects when present in isolation. For example, limonene (left-handed) smells like lemons, while limonene (right-handed) smells like oranges. The difficulty is to develop the fine chemical techniques needed for separation.

An example is the anti-inflammatory biological compound ketoprofene, which is used widely as an alternative to steroids. The anti-inflammatory action is associated with the left isomer; the right isomer by contrast decreases the anti-inflammatory effect. Therefore separation to remove the right isomer, or to produce more $\delta$-ketoprofene than R-ketoprofene, can enhance the drug’s effectiveness.$^1$

The latter chirotechnologial approach, where one isomer is produced in preference to the other, is known as *asymmetric synthesis*. This results in the production of the most active isomer only, and in addition, removes the need for disposal of the inactive isomer. C-TRI is at the forefront of developing the fine chemical processes needed for asymmetric synthesis, along with competitors in advanced countries such as Chiral Technologies, Inc, Sepracor and Chirotech Technology (now part of Ascot Fine Chemicals). The market for these single isomer drugs is estimated to be huge. In 1999, chiral molecules (ie single enantiomers) accounted for a pharmaceutical industry values at US$115 billion and projected to grow to $150 billion by the year 2003.$^2$ Contract chemical companies are stepping up their activities to service the needs of big drug companies which do not have chiral technology as yet in-house. Thus C-TRI has chosen an extremely attractive business for its medium-term activities.

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Indeed the market for chiral pharmaceuticals is being underpinned by drug regulatory developments which over the course of the past decade have driven manufacturers to produce chiral drugs rather than the mixed isomers (racemates) of the past. Japan’s authorities moved first to regulate chiral drugs, in 1987, followed by European and Nordic agencies. In the USA the Food and Drug Administration issued an important Policy document on development of stereoisomeric drugs in 1992, and for the past decade has been tightening the regulatory regime to create strong incentives for drugs firms to produce single enantiomer drugs, and strong disincentives to continue with mixed racemates. Thus mixtures of stereoisomers will no longer be brought to the pharmaceutical market place. In future, each chiral form must be pure and separately assessed for registration. Thus a wholly new industry based on making pharmaceutical products in pure chiral form has been created. C-TRI is one of the firms in on the ground floor of this development.

Immunoglobulin (IgY) business

C-TRI is one of a handful of businesses worldwide investigating how to enhance the production of antibody (immunoglobulin) by extracting it from egg yolk rather than from the blood of stressed animals. Several kinds of antibody can be produced in this way, useful in medicine, foods, cosmetics and animal feeds. Human immunoglobulin IgG is produced by all mammals, which is why mammals such as rabbits, goats and horses have traditionally been used as the source. The animal is treated with the specific antigen against which antibody is desired, and over the course of two weeks the animal builds up antibody in its blood, which can be extracted as serum by periodically bleeding the animal. This is both distressing to the animal, and a very slow way to produce IgG.

The alternative of utilizing egg yolk is now widely recognized but acted on by very few firms. The bird immunoglobulin (called IgY, after yolk) is very similar to mammalian IgG, and virtually identical in its clinical effects. The bird can be dosed with antigen, and it then develops the required antibody, passing it to the egg for protection of the new chick. Chickens produce up to 200 eggs per year and so can produce much more antibody than the animal, and moreover in more concentrated form. C-TRI and competitors like AviGenics, Alpha Diagnostic International and Ovo Biotechnologies are building a new worldwide awareness of the advantages of chicken IgY as a safe alternative to mammalian IgG. C-TRI already markets an IgY product, used for example by patients to combat infections and stomach ulcers linked with Helicobacter pylori.

7. Long-term businesses

For the longer term (three to five years) C-TRI is focused on innovative new drug development and products not yet in commercial production anywhere in the world. This is a remarkably ambitious program for a fledgling company in Korea.

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4 For an overview provided by Alpha Diagnostic International, see “Polyclonal antibodies in chicken: Beyond omelets and sandwiches” : http://www.4adi.com/service/chicken.html.
Advanced R&D in the immunological field is proceeding at C-TRI, requiring heavy expenditure of resources. Advances in both the immunomodulator field and immunosuppression field are sought, to facilitate production of pharmaceutical products that can, for example, reduce the body’s resistance to tissue grafts.

But the most ambitious of the longer-term projects is undoubtedly the extraction of human proteins from chicken eggs through the use of transgenic technology.

**Human protein production through transgenic chickens**

The business of producing human proteins through genetic recombination, ie by splicing a human gene into the genetic structure of an appropriate animal or cell model, promises to be one of the biggest businesses of the 21st century. Already some artificially produced human proteins earn enormous revenues for their producers, who protect their goldmines with ironclad intellectual property claims. The human protein erythropoietin (Epo), for example, which is produced largely in the kidneys but acts in the bone marrow to stimulate red blood cell production, is one of the earliest of this new class of biotechnological products. Only about 4kg of Epo is produced each year worldwide, with a sale value of $4 billion – making it one of the highest value-added substances on earth. The U.S. biotechnology firm Amgen is a leading producer, through its products Epogen and Neupogen. It has U.S. patents to several aspects of Epo production which it vigorously defends. It has been embroiled in lawsuits through the 1990s with licensees such as Genetics Institute and Chugai, and in the later 1990s and 2000 with another U.S. biotechnology company, Transkaryotic Therapies, Inc (TKT) which in association with Aventis produces and markets Epo through a different synthesis route. The stakes in these markets are high and companies go to great lengths to create or defend monopoly positions.5

For Dr Wan-Joo Kim and C-TRI the issue is not how to get involved in such patent disputes, but how to perfect a synthesis procedure involving genetic recombination that will support the company’s efforts when the Amgen patents on Epo expire, beginning in the early 2000s. To this end, C-TRI is pouring its few resources into development of a transgenic chicken model that could be used to extract Epo, as well as a host of other human proteins, from egg yolks. Professor Kim also has his eyes set on a vast range of human proteins to be developed via the same route, such as interferon products and the range of specialized chemicals now known as cytokines.6 C-TRI is actually one of the world leaders in this race, utilizing a technique known as liposome-sperm-mediated gene transfer, being developed in collaboration with Professor Rottmann at the Technical Institute in Muenchen,  

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5 Amgen achieved an important legal victory over TKT and Aventis in January 2001 when the US District Court of Massachusetts issued a ruling that limits the rights of TKT and Aventis to market Dynepo, on the grounds that it partially infringes Amgen’s patent rights. In 2000 sales of Epogen by Amgen amounted to nearly US$2 billion, accounting for just over half of Amgen’s sales revenues; the worldwide market for Epo products is estimated at $6 billion. See Pamela Sauer 2001, Amgen prevails in key Epo patent suit, *Chemical Market Reporter*, Jan 29 2001.

6 The term cytokine was introduced to separate a group of immunomodulatory proteins from other growth factors, but it is now applied to a diverse group of human proteins and peptides which act as bioregulators at very low concentrations. In general they act on a wider spectrum of target cells than hormones, and they are expressed throughout the body, and not just in specialized organs. See the Cytokines Online Pathfinder Encylopedia (COPE): http://www.copewithcytokines.de.
Germany. Major competitors include the U.S. firm AviGenics and the Roslyn Institute in Scotland (famous for production of Dolly, the world’s first cloned sheep).7

8. Resources, routines and relations needed for establishment of the new venture

In general, every new venture needs to mobilize basic resources, routines and relations with other firms in order to become established. The resources are the basic sources from which value is generated. They include the financial and technical resources from which the business is constituted, as well as intangibles like intellectual property, licenses and other sources of strategic distinctiveness. The routines are the processes developed by the firm to activate or exploit its resources. They include routines devoted to product development, to manufacturing, distribution, logistics and marketing, as well as management of intellectual property, management of alliances, and other features of knowledge management for a knowledge-intensive venture. The relations with other firms are the means through which the firm becomes embedded in a wider industry and draws sustenance from its environment, just like a biological organism. It is the resources, routines and relations that provides the foundation for a new venture’s strategic distinctiveness.8

Resources

Capital resources
Initial capital came from Dr Kim and his five co-founders (similar to the case of Acer founded by Stan Shih and partners in 1976). This was in April 1998, when Korea was experiencing the worst of the economic crisis. But the economy picked up rapidly, and soon private investment firms were looking for new ventures to fund. C-TRI was an attractive option, and so it attracted private investment from VC firms and investment trusts such as the Hyundai Venture Capital and banks such as Kookmin Bank (the largest in Korea) – as equity investors. C-TRI never accepted bank loans, and today has a debt-equity ratio of zero. This again provides a striking point of contrast with earlier Korean entrepreneurial approaches, which was to rely heavily on debt financing.

R&D resources
Initial R&D resources were drawn from the knowledge assets brought by the founders, and by their establishment of a sophisticated R&D laboratory at Myongji University. This drew on the existing facilities and networks already established at the university. These R&D resources were extended by the relations that Dr Kim established with overseas researchers.

Production resources
The new investment made in C-TRI enabled it to consider the purchase of some production facilities for its initial, revenue-earning fine chemicals and pharmaceutical products. One option was outsourcing – an obvious option for a small, R&D-intensive company. But the opportunity to purchase the Korean production facilities of Bayer A.G. emerged quite unexpectedly as an attractive alternative. The

7 AviGenics claims to have expressed a human protein, alpha-interferon, in the eggs of transgenic chickens. See http://www.avigenics.com/companyprofile.html.
purchase of the Bayer A.G. Korea production plant was a major source of production resources. This brought in process technology, production equipment, production routines and skilled staff, all at once. The key was to manage these assets in such a way that they would want to stay with C-TRI, which indeed they have done.

**IP resources**

Chiral materials are covered by IP protection, and so C-TRI has had to be careful to avoid infringement, and has taken out its own patent protection as well. These are IP resources for C-TRI. Within the first two years of its existence, C-TRI has taken out no fewer than 16 patents covering processes and preparation of intermediates utilized in the fine chemicals industry. (Note that Dr Kim was unable to bring across to C-TRI any of the patents he had taken out when employed in the GRIs KIST and KRICT (in excess of 60) since these belonged to the establishments rather than the individual.

**Routines**

As a latecomer in its industry, C-TRI has not been concerned to develop distinctive routines so much as to acquire the routines needed to conduct a business in the first place. The basic business routines were brought by Dr Kim across from his years of employment as CEO of Hanmi Fine Chemicals. These routines encompassed basic routines for bringing products to market, servicing customers, collecting revenues, and producing business statements. In the company’s second year, the Bayer A.G. plant was the source of many of the needed production routines. C-TRI was able to specialize its needed routines from this basic portfolio acquired from Bayer.

As a fast-growing entity, C-TRI needs to expand its capital base and seek listing on KOSDAQ, through an IPO. The VC investors are the source for many of the investment routines employed. This is increasingly the case in the biotechnology field, where VC investors actually inject needed capital budgeting and cash flow management routines into the companies attracting their investments.

**Relations**

C-TRI has not utilized any of the obvious kinds of relations, eg customers taken from the founders’ previous employer. It has relations with some Korean firms, such as Hansul Chemiense and institutes like Medicinal Resources Research Center. With Hansul Chemiense it has been involved in a project to jointly produce a new development formulation for Taxol, an anti-cancer “wonder drug.” The founders also have strong relations with their former institute, the KRICT.

As for most biotechnology ventures, key relations have been established with leading researchers in universities around the world. These constitute much of the precious intangible knowledge resources of the company. These relationships draw on the links established by Dr Kim and his cofounders during their years in university and government research centre research. These collaborations include those with:

- Prof Dr O.J. Rottmann, Technical Institute of Muenchen University, Germany
  Transgenic chicken (liposome-sperm mediated gene transfer)
- Prof D.Y. Mine, Department of Food Science, Guelph University, Canada

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9 For a description of Taxol, see the “Molecule of the Month” review provided by the School of Chemistry at the University of Bristol: [http://www.bris.ac.uk/Depts/Chemistry/MOTM/taxol/taxol.htm](http://www.bris.ac.uk/Depts/Chemistry/MOTM/taxol/taxol.htm).
C-TRI's academic relations have been strengthened by the creation of an Academic Advisory Board (a common practice amongst science-based firms, but highly unusual in Korea). The Board currently calls on the figures identified above, as well as academics in centres such as the College of Medicine at the Asian Medical Center, Ulsan University of Korea. Thus the academic relations are worldwide without neglecting the domestic sphere.

9. Prospects and issues for the new venture

C-TRI is not yet three years old. It is approaching its IPO in April 2001, which will constitute a major milestone for the fledgling firm. But its successes to date have been remarkable. Above all it stands as a testament to the seriousness with which Korean firms and institutions are building new foundations for a knowledge-based economy in Korea after the financial crisis.

It is the personal qualities of Dr Kim the founder that provide the most promising foundation for C-TRI’s future success. He has a business vision that is broader than just making money, or broader even than making a contribution to technological innovation. He has aspirations to make a contribution comparable to his hero, Dr Paul Janssen, the Belgian founder of Janssen Pharmaceuticals. Dr Janssen, now in his 90s, is a legend in the pharmaceutical industry for the remarkably high rate of success his company has achieved in developing new drugs across an astonishing range of clinical applications. Dr Janssen himself has an encyclopedic knowledge of pharmaceuticals, but is also an inspiring figure, who has maintained practical laboratory skills all his life.10 Dr Kim has met Dr Janssen twice, once when Korea was awarding Dr Janssen its national prize for achievement in the field of gastroenterology. For Dr Kim, the role of Dr Janssen is to be a modern “hero” or inspiring figure, not for prowess in combat and killing enemies, but for prowess in saving lives and building our knowledge and biotechnology on an understanding of and respect for nature, rather than as a substitute for it. These are indeed admirable goals, and reveal how deep are the ethical roots of good business practice.

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10 Janssen Pharmaceuticals is part of the Johnson and Johnson group, but maintains considerable business and intellectual independence within this structure.