CORPORATE FINANCE INC.

White Paper

Corporate Finance, Inc (CFI) is a steadfast advocate of entrepreneurs and small business enterprise. We believe society's well being is, in large part, the product of entrepreneurship and that every citizen should care about creating an economic and social environment in which emerging ideas can flourish. CFI encourages research and analysis of issues about entrepreneurship and helps disseminate the ensuing White Papers – including many published by senior management of CFI portfolio companies.

Entrepreneurs Advance On Tech Transfer's Facile Territory

Tom Trexler, President

According to the National Science Board (NSB), some $6 trillion was spent on R&D from 1993 to 2003 and the pace of expenditure is accelerating. Output (Intellectual Property) from the activity makes-up Tech Transfer's raw material. An inventory of underutilized raw material available for Tech Transfer and commercialization is steadily accumulating despite the fact that R&D spending is heavily weighed toward "development." The economic importance of Tech Transfer can be expected to grow as IP related sales, in relation to physical product, increasingly contribute to US trade balances.[1]

CFI's *Intellectual Property's Disruptive Niche* White Paper – an exegesis of NSB Science & Engineering Indicators – connects the dots while probing the consequences of how, and by whom, IP is commercialized. The Paper also describes a niche within the overall "R&D/IP Market" and argues that the niche is more suited to commercialization by small companies and entrepreneurs than by traditional enterprises.[2]

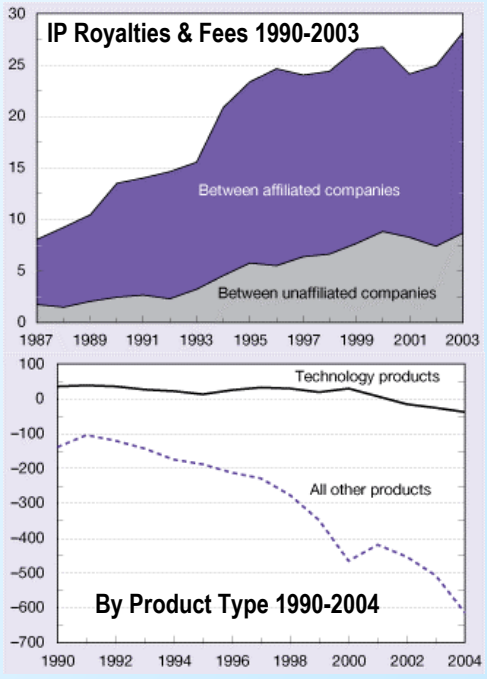
That niche (Disruptive IP) is the subject of this paper.[3] The paper suggests entrepreneurs and small companies make the most of tech transfer opportunities when they: concentrate on *Disruptive* (rather than *Sustaining*) opportunities; negotiate innovative alliances (instead of cookie cutter licenses) with IP creators; and, exploit x10 and $x10^2$ (in addition to x1) options for building value.[4] Example cases described in the paper are drawn from CFI experiences in working with 300 portfolio companies over the past decade.

Why Technology Transfer Opportunities Matter

Most things that smooth the way for humanity, including most job growth in the USA, are created by entrepreneurs and SMEs (Small-to-Medium Enterprises.) They do so extremely efficiently: with far less than 20% of the capital used by large enterprises. It has been argued that it was this powerful American "entrepreneurial engine," – exemplified by such legendary pioneers such as Bell, Ford, and the Wrights – that let America win WWII and the Cold War.[5]

More recently, evidence is growing that the need for entrepreneurial expression – or at least for territory and epic challenge – may be deeply rooted in DNA. A convergence in the views of economists, educators, cultural archaeologists, and behavioral scientists suggests the need is ignored at some risk to society.[6]

Over the past 20 years, government policies and financial trends dramatically reduced the availability of capital[7] for USA Concept Stage and SME entities. Disruptive IP tech transfer has potential to buck the trend and may be facile ground for seasoned managers with an entrepreneurial itch. When Harold Geneen[8] was asked why he "bothered" with a little company like SL Holdings after retiring as CEO of ITT, he said "It's good to be an owner. I've made more in three years as a stockholder here than in all my years at ITT."



Source: NSB *Science & Engineering Indicators 2006*

It's also an ideal arena for retired executives seeking brain food or wishing to make a mark as "the voice of experience" in an industry transformation or "the coach" to a new generation of managers.

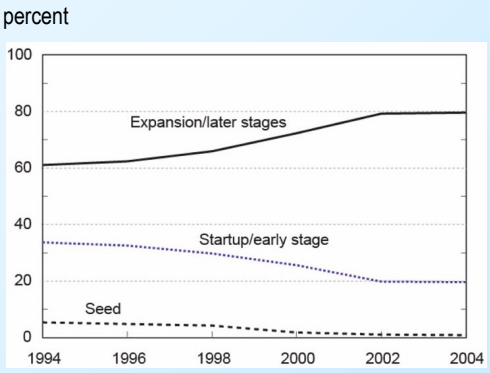
Food For Thought

The three cases[9] described in this paper were selected to trigger ideas and kindle dialogue. They include examples of transfers between Business, Government, and Universities (B, G, and U in the Value-Add Models chart.) Examples of the three possible value-add models are discussed (indicated with '☼' in the chart.) The seven potential combinations not discussed in the paper are indicated with 'o' in the chart.

Transaction Type		Type of Model		
source	target	x1	x10	$x10^2$
B	B	o	o	☼
B	G	o	o	
U	B	☼	o	o
G	B	☼	☼	o

Value-Add Models

Disparate characteristics of the three cases show the futility of approaching tech transfer with a cookie cutter mindset (management talent being the only common thread.) Each case required crafting win-win resolutions of licensee and licensor needs. Solutions are dissimilar because needs are dissimilar. Much of the art is in characterizing "the customer" (counter intuitively, both licensee and licensor may be "customers" of the other in tech transfer) and in uncovering implicit needs. While a tutorial on the process is beyond the scope of this paper, CFI finds that much of Huthwaite's methodology[10] for major sales also applies to tech transfer of disruptive IP.



Venture Capital Disbursements By Stage of Financing: 1994-2004
Source: NSB *Science & Engineering Indicators 2006*

Case I *University to Business*[9]

Few minds can wrap around fundamental questions of basic research, new application inventions, innovative market offerings, and the intricacies of transforming industries. Commercializing the

University-to-Business Tech Transfer[9] (Pure x1 Example)

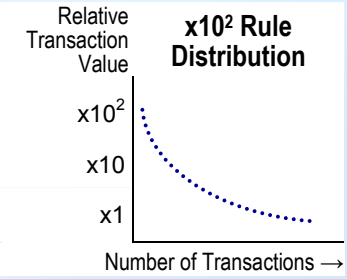
The Intellectual Property Johns Hopkins developed a snippet of DNA (LAMP) that can be used to "backpack" a protein (antigen) into a special compartment (lysosomal) of certain cells (e.g. white corpuscles) in the blood stream. The lysosomal compartment is interesting because it is a small factory capable of manufacturing things that trigger the immune system to manufacture "smart bullets" – killer T cells that only attack specific types of cells. Put the right stuff in the backpack and, theoretically, a patient's own immune system will produce smart bullets to kill cancer cells or HIV.

Anticipated Market Early adaptor candidates include pharmaceutical companies that have developed the "right stuff" to cure a specific disease – if only they can get it into a patient's lysosomal factory, which is what LAMP facilitates. LAMP, for example, could potentially be used to help a patient's own body produce vaccines – which would be cleaner than making vaccines in pigs and chicken eggs. Approximately $23 billion per year is currently spent on R&D and trials of pharmaceutical products which could potentially benefit from LAMP. Additional genetic engineering applications are also being explored.

IP Owner's Challenge LAMP is a tool, not an end product in the same way that software compilers and robots are tools that are used to make end products: a word processing program or car, for example. Much of LAMP's perceived value to potential "tool" users is the expertise residing at Johns Hopkins in the inventor's mind. Similarly, Japanese auto manufacturers that purchase robots from Process, Inc in Ohio first ask the robots' designers to spend time in Japan to transfer know-how. The result? R&D comes to a halt while key staff work on less interesting, and unbillable, work.

Tech Transfer Innovation Capital Genomix and Johns Hopkins created ITI, a jointly owned company, to package LAMP, develop additional applications, and seek high-value restricted purpose licensing opportunities. Capital Genomix is highly experienced in tech transfer and has expertise in the field. The broad goals, division of responsibilities, metrics, and working relationships were personally planned by Capital Genomix's CEO (Bill Hearl, a PhD) and Hopkins's inventor, Tom August, PhD. Two factors were key: ITI will develop applications for LAMP in addition to recruiting licensees (which frees Hopkins to focus on basic LAMP research) and Mr. Hearl's commitment as ITI's full time CEO. Two months after completing the IP agreement, ITI sublicensed LAMP to Geron Corporation (Nasdaq: GERN) for a specific cancer application.

fruits of basic research calls for such skills. The inner strength to embrace uncertainty, an appreciation for exceptional talent, and the sensitivity to avoid disrupting creative thought are also called for. Fortunately, the requisite leadership was available.



Source: *IP's Disruptive Niche*

Cutting edge probing of DNA's machinery by world class researchers at Johns Hopkins has led to vital discoveries, including basic "materials handling" techniques – ways to identify, "snip," move, and recombine microscopic pieces ("sequences") of DNA. The tools, and the knowledge of why they work, have potential to remove barriers for thousands of scientists exploring "better living through DNA." Superior ways to insert specific pieces into a specific part of living cells was a particularly critical finding. The commercialization solution described in the side-bar gives scientists access to DNA tools they need, minimizes disruption to important basic research at Hopkins, and helps the University participate in the value created by its discoveries.

Case II *Business to Business*[9]

Case II is less complex than Case I. The IP was mature (having run $2 billion of transactions.) Licensee and licensor identities and needs were clear. The challenge was scale: too extensive for many to grasp and an IPO exit, now out of favor. So, the project was packaged to "look familiar" to institutional investors: as a value-added industry consolidation. A Chairman, CFO, COO, and CMO with national reputations were selected for the $45 million raise.

Case III *Government to Business*

Case III (see sidebar on next page) began as a blank sheet of paper. IP was in the early theoretical concept stage. Validation, market research, commercial analysis, and time to market estimates were needed. Developer's needs were undocumented and potentially more complex than mere issues relating to tech transfer.

The solution was to treat the venture, not as a transfer, but as a project to design a solution for a comprehensive set of functional requirements. Project techniques and terminology familiar to the client were used. Client participated as a member of the project team. Including CFI Executives in Residence in the team reduced project cost, created a ready-built experienced, candidate pool of informed potential managers, and opened doors to early adaptor IP licensees.

Business-to-Business Tech Transfer[9] (Pure x10² Example)

The Intellectual Property The IP developer invested $18 million to create a supermarket enterprise system, port enterprise system best practices to supermarkets from other industries, refine system sales methods, and install systems in stores belonging to early adaptors.

Anticipated Market Primary targets are supermarket chains operating approximately 25,000 stores with aggregate revenue of $500 billion. Total potential market size is $2.5 billion of new system sales; $250 of annual support services; and, $250 million of annual information and analytics sales. Total customer ROI potential for the market is $9.5 billion of annual earnings increase (based on one-time purchase of $2.5 billion of new systems) and a one-time market cap increase of $95-135 billion.

IP Owner's Challenge Cultural resistance from midlevel managers and MIS (computer) personnel resulted in higher than expected sales and implementation cost.

Tech Transfer Innovation CFI's portfolio company negotiated the exclusive right to market and use IP (enterprise technology and practices) within an industry segment in a way that does not impact the technology owner's intended market. IP owner receives royalties, incremental maintenance revenue, "bragging rights" related to use of its technology in a previously overlooked segment, and equity in a venture with significant upside.

Rather than "sell" technology (x1 type revenue), CFI's portfolio company targets x10² revenue by acquiring distribution centers within the market segment and upgrading them. The goal is to capture market cap increases resulting from the application of the IP. Performa projections, based upon acquisition funding of $45 million, are for $6.8 billion of revenue in year five with a market cap of approximately $30 billion (assuming a PEG ratio of 0.5.)

Seven types of acquisition funding, including equity capital, were identified. After initial investment banker's failure, project was directly shopped to 124 institutional capital sources. Terms varied widely: least expensive (conventional bank debt) being 8½ % interest, with no equity participation – most expensive (Credit Suisse), 12% debenture convertible into 80% equity.

Government-to-Business Tech Transfer
(x1 & x10 Example)

The Intellectual Property A Federally Funded R&D Center ("FFRDC") developed and patented statistically supported pattern recognition basic concepts for detecting certain types of malicious internet disruptions (e.g. viruses.)

Anticipated Market Universe of potential users includes a variety of entities: software developers (e.g. operating systems, security packages, browsers, web-based applications); internet service providers; communications providers; and, large government and commercial IT infrastructures. NIST ("National Institute of Standards & Technology") estimates 2002 economic damage to users of exploited flaws in software was $60 billion. A 2005 Carnegie Mellon report estimates software vendors loose 0.6% in market cap (an average of $860 million) per vulnerability announcement.

IP Owner's Challenge FFRDC's charter required balancing: culture of creativity and imagination; a focus on government projects; and, certain commercialization boundaries. FFRDC also wished to build a "nonprofit-like research funding pool" to increase mission efficiency by smoothing funding volatility and retain talent temporarily not directly billable to projects.

Tech Transfer Innovation A Letter of Intent was used to provide an environment for project staff and managers to develop a functional specification of the FFRDCs objectives and design a practical, real-world commercialization model to achieve the objectives. Contributions to the functional design by CFI Executives in Residence led to additional benefits – including: unanticipated applications; relationships with potential early adaptor licencees; and, access to innovative commercial IP and expertise with potential to facilitate FFRDC's overall mission.

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For information about White Papers, Executives in Residence, and concept stage enterprises, contact:
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NOTES

[1] *Science & Engineering Indicators, 2006*; National Science Board.

[2] *Intellectual Property's Disruptive Niche*, Corporate Finance, Inc. White Paper, by Merle Coe, April 2007.

[3] The term *disruptive* technology was coined by Clayton Christensen in his 1995 article *Disruptive Technologies: Catching the Wave*. He further defines the term in his 1997 book, *The Innovator's Dilemma*.

[4] The value creation pattern subsequently named the "*x10*^{2} *Rule*" was first observed during a 2006 analysis of the Tech Transfer activities of 300 CFI portfolio companies. The pattern was described in the *Intellectual Property's Disruptive Niche* White Paper published by CFI.

[5] The subject is relatively uncontroversial with almost uniform consensus. An extensive body of research and literature is available of which the following are examples. *Small is Beautiful* by Stephen A. Boyko & Alan Gottesman, The National Interest, No. 77 – Fall 2004. *Ownership Society* by Stephen A. Boyko & Merle Coe, The National Interest (January 28, 2005) http://www.inthenationalinterest.com/Articles/January%202005/January2005BoykoPFV.html *Exploring Entrepreneurship*, Pace University Business Journal, Nov.15, 2004, http://appserv.pace.edu/emplibrary/GlobalFinanceNewsletterNov04.pdf

[6] Jared Diamond, *Collapse*, (Penguin Group, 2005) Merle Coe, *The Risk Taking Gene*, (CFI White Paper, 2006) Robert Ardrey; *The Territorial Imperative*; Antheneum Publishing; New York, 1966 Postman, Neil; *Amusing Ourselves to Death*; Penguin Books, New York, 1985

[7] Leone, Marie, *Sell Side analysts dropping small caps*, CFO.com, July 8, 2004 Grady, Robert E., *The Sarbox Monster*, WSJ Editorial, April 26, 2007, Page A17 (Grady runs VC arm of Carlyle Group)

[8] Consummate manager and pioneer of the archetypal modern multinational conglomerate, Harold Geneen grew ITT from $760 million sales in 1961 to $17 billion in 1970 – primarily through 350 acquisitions and mergers in 80 countries. He once said, "It's better to take over and build upon an existing business than to start a new one." His acquisitions included Hartford Fire Insurance Company, Sheraton Hotels and Madison Square Garden. To manage the disparate entities, he invented a Sigma 7 prototype.

[9] Disclosure: ITI, Capital Genomix, and CCA (the B2B example) are CFI portfolio companies. Mr. Hearl and four CCA C-level executives are memebers of CFI's Executives in Residence.

[10] Huthwaite, the leading international sales consultancy, pioneered the engineering of sales processes based on statistically based metrics. Readers are referred to *Rethinking The Sales Force*, McGraw Hill www.Huthwaite.com