The Role of Venture Capital in Building Technology Companies in the Ottawa Region

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December 2003

Abstract

This chapter reviews the role of venture capital in building technology companies in the Ottawa region. We find four distinct periods of venture capital in the region: before 1990, between 1990 and 1997, between 1997 and 2001, and since 2001. These periods are relatively distinct in terms of the investors present in the market, the companies seeking capital, the investment climate, the terms and instruments used, and the contribution made by venture capital to business development. Our review provides a picture of the development of the investment infrastructure for technology companies in the region. (94 words)

Key words: venture capital, technology companies, regional development

Introduction

The objective of this chapter is to describe the role that venture capital has played in the development of technology companies in the Ottawa region. We ground our description in four periods of time: before 1990, between 1990 and 1997, between 1997 and 2001, and since 2001. We find these periods to be relatively distinct in terms of the investors present in the market, the companies seeking capital, the investment climate, the terms and instruments used, and the contribution made by venture capital to business development.

The role of venture capital in the creation of value remains a controversial one in the research literature. Ideally, a venture capital investor can bring many things to an entrepreneurial venture – capital first of all, of course. Venture capital can accelerate the development of a venture and allow it to hit market opportunities in a timely way. Venture capitalists may also bring a wealth of operating and company governance experience. They may bring connections with customers, suppliers, partners, and potential executive hires. It is the experience of entrepreneurial companies in general, however, that venture capital can have serious negatives. We argue that there have been instances in which venture capital involvement has not been beneficial on balance for companies in the region.

There are many natural sources of conflict between venture capitalists and entrepreneurs. As equity investors, venture capitalists want the companies in which they invest to be successful. There are many versions of "success," however, in any situation as complex as building a new company. For the founding team of entrepreneurs, successful innovation can be the creation of a company of which they can be proud, that provides a good living, and may provide real equity value at some time in the future. This process might take 10, 15, even 20 years and still be successful. Entrepreneurs are normally not diversified – their entire fortunes will be tied up in their companies. On the other hand, a venture capitalist will have a reasonably diversified portfolio of a dozen or more investments. Moreover, for the venture capitalist success is very specific and clear cut.

A VC invests only with the prospect of realizing real equity value through a liquidity event like acquisition or an initial public offering – generally within a period of 5 to 7 years (Lerner, 1994).

Venture capital investment in the region goes back at least 30 years, but significant VC investment in the region is relatively new. Most of the venture capital invested in the region has been invested within the last five years.

The role of venture capital in the growth of industry clusters like, that of Ottawa, have been addressed by others. Kenney and Florida (2000) and Banato and Fong (2000) address the role of venture capital in the Bay Area south of San Francisco. Mallett (2002) and Mason, Cooper and Harrison (2002) have written about Ottawa. It is a good time for a fresh look at the role of venture capital in the Ottawa region, however, because we have just passed through a full cycle of boom and bust. Much has changed over the last couple of years.

The key question that this chapter tries to address is: To what extent has venture capital helped technology companies create value in the Ottawa region?

The chapter is organized as follows. We first present four small case studies that illustrate venture capital investment in the region, for better and for worse. In the following section, we describe the financing of startup companies and the role that venture capital plays in this financing. We then review the question as to whether or not, in general, venture capital creates value. The following section forms the core of the chapter. In it we review the four periods of venture capital involvement in the Ottawa region. We then conclude by addressing the basic question of the chapter: has venture capital helped technology companies create value in the region? We propose that the answer is not a straightforward yes or no.

Four Case Studies

We first present four small case studies of VC investing in the Ottawa region: two definite failures, and two much more successful investments. VC firms heavily invested in Zenastra and Trillium and the companies went out of business soon after. Tundra is a successful public company that was VC backed. Catena is a more recent company – very heavily supported by VC money – that seems to have the potential to become a significant, successful public company. We present these case studies to illustrate the role of venture capital investment in the region.

Zenastra[1]

Zenastra started up in February 1999 as Nu-Wave Photonics. In 1997 an Iranian immigrant, Hamid Hatami-Hanza brought the technical idea that formed the basis for the company to Peter Brownhill, a former Bell Canada executive. Brownhill, impressed with the potential of the idea contacted Patrick Shea, a former Bell colleague in 1998. Shea had successful start-up experience and was at the time investing as an angel in the region. Shea contributed seed money to keep the idea moving forward. In 1999, with promising lab results Shea facilitated $4 million in financing - $1 million from friends and $3 million from three venture capital funds: Ventures West Management Inc., VenGrowth Investment Fund Inc. and Bank of Montreal Capital Corp (also BDC and Eastern Technology Seed Investment Fund). Nu-Wave was officially launched in February 2000.

The company attracted a number of high quality executive and technical personnel, many from local optical networking giants Nortel and JDS. By April 2000 they had 40 engineers employed.

[1] Sources include: Bagnall, J. (2000). Firm sets venture capital record: Startup lands $50M, largest placement in region's history. *Ottawa Citizen, April 3, final edition*, p. A1; National Post (2001). The Venture Capital Top 50. *April 1, National edition*, p 76; Enman, C. (2001). Downturn? What downturn? How three companies are coping. *Ottawa Citizen, March 26, Early Edition*, p D8.

On May 19 2000, the company announced what to that date was the largest venture capital deal in the history of Ottawa - $40 million U.S. The lead underwriter for the deal was Yorkton Securities with HSBC Securities (Canada) acting as co-underwriters. The full investor list was never released but the placement was syndicated to a number of Canadian and U.S. institutional and private clients, and included BDC Venture Capital Division, VenGrowth Investment Fund, BMO Technology Investment Program, Ventures West, Triax Growth Fund, Jefferson Partners and Lawrence & Company. The company had intended to raise significantly less than it did but the underwriters found the level of investor interest to be very high and urged Nu-Wave to consider a much bigger deal.

Announced at the same time as the VC placement was the appointment of Peter Scovell as President and CEO. Scovell was the former head of Nortel's Optoelectronics Group. His appointment was effective on June 5. Another notable appointment in June of that year was that of Ken Hill as chief scientific officer. Hill was an "optical legend."

By the start of 2001, the market for optical telecommunications products had softened considerably – as had investor enthusiasm. That spring Zenastra was looking for new financing. In March of that year Scovell was still talking, however, of taking staffing levels from 200 to 350 by the end of the year. The company also maintained that its plans for a new $40 million manufacturing plant in Kanata were still firm. The plans for this new plant were shelved publicly in August of 2001. At the end of that month, the company was still struggling to find new financing and cut staff by 160 – 64 percent of its workforce.

By October of 2001, Zenastra was out of business.[2] Start to finish the company lasted three years. From its official launch to going out of business was two years. It spent over $40 million U.S. in financing in its final 18 months.

[2] It later resurfaced as Broadwave Photonics Inc. in February 2002. Syracuse, N.Y.-based Broadnet Technologies Inc. and China's Shenzhen Laserwave Optoelectronics Co. Ltd. struck a deal with Zenastra's bankruptcy trustee in late December of 2001 to acquire the majority of its capital assets, leases and intellectual property.

Trillium[3]

Trillium Photonics was spun out from a technology incubator program at the National Research Council (NRC) in the spring of 2000. Two research scientists from NRC's photonics systems group of the Institute for National Measurement Standards founded the company: Piotr Myslinki who served as the company's initial president and CEO, and Simon Boothroyd who became its CTO. Mylinksi and Boothroyd licensed the technology on which the company was based from the NRC. This licensing was facilitated by a policy change by NRC from a few years earlier to foster more commercialization of technologies developed in its labs.

Trillium planned to develop and sell optical amplifiers that could operate in dynamic rather than static networks. Their target customers were integrated suppliers like Nortel who produced systems for the core of the developing optical Internet market.

The company received an initial VC investment of $6.5 million (U.S.) from the very prominent Silicon Valley venture capital firm of Mohr Davidow in August 2000 while still housed in the NRC incubator facilities. At the time, the firm had about a dozen employees and planned to have its first product out the door by the end of 2001. The investment was Mohr Davidow's first in the Ottawa region. At the time, the firm had plans to invest a total of $100 million (U.S.) in the region.

Mylinski anticipated the hiring of an experienced CEO right from the start. In July of 2001 the company brought in Brian Jervis to be president and CEO. Jervis resigned from the CEO role at Kestrel Solutions to take the position; Kestrel folded its four-month-old Ottawa operation when he did so. Kestrel had been expanding in Ottawa during the spring of 2001 as other companies like Nortel, Sedona Networks (a local start-up that went out of business in 2001) and Cisco were laying-off engineers and support staff.

[3] Sources include: Bagnall, J. (2002). Soul- searching and hard feelings: (Part 1): Inside Story: How Alcatel acquired Newbridge Networks. *The Ottawa Citizen, May 30, [Final Edition 1]*, p. E.2; Hill, B. (2001). Kestrel closes up shop. *The Ottawa Citizen, July 7*; Guly, C. (2001). Trillium Photonics gets set to flower: Amplifier speeds Net traffic. *The Ottawa Citizen, Mar 7, Final Edition*; Anonymous (2000) Trillium Photonics spun out of NRC. *Research Money, Oct 2, 14(12)*.

Jervis was a Nortel veteran. Subsequent to Nortel he had served as Executive Vice President of the Switching Products Group for Newbridge Networks, a position from which he was fired in late 1999.

In January 2002, Trillium received a second round of VC financing – this time for $29 million (U.S.). The VCs on this round were Spectrum Equity, JK&B Capital and Mohr Davidow. Nine months later in October 2002, Trillium ceased operations and a significant amount of the second VC round was returned to investors.

Tundra

Tundra was formed from Newbridge Microsystems, a division of Newbridge networks Corporation. It began operation as an independent company in December 1995 and was one of the first Newbridge spin-offs – known as affiliates.[4] Tundra designs, develops, markets and sells semiconductor chips that perform bus-bridging functions in embedded computer systems. It does not manufacture the chips that it sells. The company went public early in 1999.

The current president of Tundra, Jim Roche, was a founding member of Newbridge Networks in 1986 and along with Adam Chowaniec led Tundra out of Newbridge. Tundra benefited from continuous and strong management schooled in entrepreneurship within Newbridge by Terry Matthews, the most successful entrepreneur the Ottawa region has seen.

VenGrowth invested $6.9M in Tundra between 1995 and 1999. Table 1 contains a list of the investor's in Tundra just prior to its IPO. The 17.8% share of ownership held by VenGrowth was diluted during the offering to 13.1% - this share represented a market value of $16.6M[5] for VenGrowth.

[4] The Newbridge affiliate program is described below.
[5] VenGrowth held 1,794,000 shares valued at the IPO price of $9.25, Tundra's IPO Prospectus, SEDAR.com.

Table 1: Principal Shareholders in Tundra Just Prior to IPO
(goes about here)

Capital Alliance Ventures Inc., a local VC firm, was one of the original investors in Tundra, investing $144,617 in 1995. In its last fiscal year before going public (ended April 30, 1998), Tundra had revenues of $20.1M and net earnings of $473K. In the fiscal year ended April 30, 2003, its revenues were $34.0M and it lost $32.0K.[6] In spite of incurring losses recently in a very tough economy, Tundra remains a very strong competitor in its market.[7]

Catena

Catena Networks was founded in 1998 by five ex-Nortel employees and managers. It builds integrated broadband access systems that enable service providers to deploy voice, data and video services and migrate to packet-based networks. Its value proposition to service providers is anchored on reduced cost through leverage of their currently installed equipment – an attractive one for carriers hard pressed to make a profit in the current industry environment.

Still a private company, Catena is a "major venture capital play." It has secured U.S. $192M in venture financing from some of the high-tech industry's most influential investors:[8]

- Attractor Investment Management
- BCE Capital
- Berkeley International Capital
- Bessemer Venture Partners
- Goldman Sachs Group, Inc.
- J. & W. Seligman & Co.
- JPMorgan Partners

[6] From Tundra's IPO Prospectus and from its 2003 Financial Statements, SEDAR.com
[7] Tundra has just reported its Q2 results, which are very positive.
[8] Catena corporate web site, http://www.catena.com/about/

- Lighthouse Capital Partners
- Menlo Ventures
- Morgenthaler Ventures
- Munder Capital Management
- Silicon Valley BancVentures
- Stanford University
- WestAM
- Worldview Technology Partners

This is the largest amount of VC capital ever raised by an Ottawa company. Many of the other regional startups recently well financed by venture capital have gone under[9], so Catena represents an important test of the ability of venture capital to create value.

Catena sold its 1,000th access system earlier this year and appears to be stealing at least some business from industry frontrunner, Alcatel SA of Paris.[10] Its sales should top $40M U.S. this year.

[9] See Table 9 below.
[10] Bagnall, J. (2003). Swinging for the fences. *The Ottawa Citizen. [Final Edition], Jun 12,* p. F.2.

Venture Capital and the Financing of Startup Companies

Venture capital firms raise money from investors and then make high-risk investments in new businesses, with the expectation of high-returns. When raising money, a VC firm will set up a separate fund often with a specific investment policy and a stated subscription limit. It raises money up to this limit and then invests. The investors become limited partners in the fund that is run by the VC firm as a general partner. As limited partners, the investors (typically wealthy individuals[11], corporate investors and pension funds) play no role in managing the fund. Although VCs often invest their own money in their funds, for the most part VCs invest other people's money.

VC firms open, fund, invest and subsequently terminate different funds, some appealing to retail investors and others to institutional investors, on a regular basis. Termination usually takes place after around ten years. This horizon is based on the fact that it takes a VC-backed company between five and seven years to reach a liquidity event – acquisition, dissolution or initial public offering (IPO) of shares to the public. Add two or three years to invest funds raised and you arrive at the normal ten-year time period. The termination date of a fund is generally specified up front – a typical example would be ten years with the option for the VC firm to extend for a couple of years in case the fund investments do not reach liquidity on schedule. In some cases, venture capitalists may exercise control rights to force bankruptcy of an under performing investee company. This may allow the VC fund to recoup some investment through ownership of preferred shares that are paid out before common shares.

Limited partners pay VCs management fees generally between 1% and 3% of the their investment. Once a fund is terminated, the limited partners get their money back first. Then the VC firm as general partner receives "carried interest" of around 20% of the capital gains realized by the fund over its lifetime. The limited partners receive the rest.

[11] There are labour sponsored funds that cater exclusively to individuals and are accessible to those who are not necessarily wealthy. They raised significant amounts of venture capital in Canada during the 1990s. They are described below.

It is only at fund termination that the limited partners realize liquidity on their investment.

Venture capital firms tend to specialize both geographically and by area of business. VC investing requires specialized knowledge and contact with prospective companies. It also takes a lot of time. It can take 9 or 10 months or more between initial contact and actual investment in a company.[12] As a result, VC firms do not handle the volume of invested funds regularly handled by fund managers of more liquid established stocks. The fees charged to investors by VCs are correspondingly higher.

The investor returns on a venture capital fund are typically generated by a small fraction of their investments. One study of venture capital portfolios reported that about 7 percent of investments accounted for more than 60 percent of the profits, while fully one-third resulted in a partial or total loss (Bhidé, 2000: 145). It is actually a minority of startup companies that require VC funding. The vast majority of entrepreneurial start-ups are sole proprietorships in the service industry with limited opportunity for growth (Bhidé, 2000: 13).

For those start-up companies that do have business models requiring significant up-front expenditures on product/service development and business infrastructure creation, the normal sequence of financing is shown in Figure 1.

Figure 1: The Role of Venture Capital in the Financing of Startup Companies (goes about here)

The stages of new venture financing

i) Seed financing

Seed financing, usually in the tens of thousands of dollars range, takes a startup from idea to opportunity and the development of a real business plan. Individuals are important

[12] During the fevered investment environment of the late 1990s, this interval shrank. It has since lengthened again significantly.

investors at this stage. The company founders are the first to invest – actual dollars and even more commonly sweat equity, i.e., they flesh out their opportunity in the form of a business plan and, perhaps, a product prototype for nothing. This type of initial investment can extend to employees as well. If the founders are intent on raising venture capital, they will definitely have to go to "family and friends" to raise equity capital in this early stage. The ability to go to friends and family and convince them to invest is regarded as a sign of commitment by the founding entrepreneurs to a real, quality opportunity.

Angel investors also provide seed financing. Angel investors are individuals who invest their own money. In the Ottawa region, there are three kinds of angels. There are those who see being an angel as a career. They act much like VCs. They may form a group with a fund and have management fees. They often try to co-invest with VCs. A second type is the passive angel investor with a high net worth who has made his or her money in non-technology types of business. They may own a chain of successful restaurants, for example. They play the stock market, invest in property and in VC funds, but also invest directly in startups. The third type is the retired serial entrepreneur who knows technology-based business. They invest not only for the returns but to give something back to the community.

Angels generally keep a low profile in their communities, not wanting to be pestered by start-ups looking for money, but preferring to find investment opportunities through their personal business networks. In the Ottawa region, angels invest in the $50K to $150K range. The level of angel financing tends to be higher in the States – usually between $100K and $500K. Because angels often have deep knowledge of an industry and of the entrepreneurs that drive them, they bring credibility and contacts with their investments.

ii) Startup financing

Individuals, particularly angels, remain important sources of financing in the startup phase when the company undertakes R&D, prepares product prototypes and initiates

contact with potential customers. At this stage, however, government and venture capital firms also become important.

The federal government has a variety of programs to help startup companies. The Industrial Assistance Research Program (IRAP) of the National Research Council Canada (NRC) and Technology Partnerships Canada (TPC) support innovative small and medium enterprises by investing in projects in the pre-commercialization stage. The Scientific Research and Experimental Development (SR&ED) Program is a federal tax incentive program designed to encourage Canadian businesses to conduct research and development (R&D). The SR&ED Program is the largest single source of federal government support for research and development. The Technology Partnerships Program (TPP) supports partnerships between postsecondary institutions and small and medium-sized Canadian companies to a maximum of $150,000 annually, with the industrial partners providing the balance in cash and in kind. Activities aimed at demonstrating the technical and economic feasibility of an invention or discovery are eligible for funding.

Venture capital firms start to become important at this stage particularly if the "burn rate"[13] of the company increases and they need the amount of financing that VCs can provide – generally over a million dollars.[14] VC investments are very commonly *syndicated* – there will be a lead VC that organizes a group of VC firms to invest in a start-up. They are also commonly *staged,* so that multiple rounds of venture capital investment may be required to take an early-stage firm to liquidity. Each funding round is negotiated at the current valuation of the firm, and often dilutes the ownership of existing investors.

Like angels, VCs supply many other things to a new venture in addition to financing. They often bring a deep knowledge of technologies and markets, and as a result can add significant value in terms of business model and marketing strategy. VCs can have large

[13] A startup company's burn rate is the rate at which it spends money.
[14] Note that individuals can invest in venture capital funds via labour sponsored funds described below. They are labeled LSFs in Figure 1.

networks of contacts – with other investors, customers, potential partners, and managers. These contacts can be of great value to a new venture. Investment in a start-up by a prestigious VC also brings credibility in both the financial and product markets.

iii) First stage expansion

As companies enter product development their cash "burn rate" can increase significantly. It is when this happens that VC funding is critical. Government also plays a role here, as do individual investors but are of less importance than VCs. The first or Series A venture capital often occurs at this stage.

iv) Second stage expansion

Second and third round VC financing (series B and C rounds) occur during this stage. Companies also use the TPP program during this stage.

Banks may get involved at this stage, especially if the company is generating cash flow from customer sales.

v) Third stage expansion

As a startup grows and proves its business model, investment risk can decrease. At this point the need for capital can increase substantially to finance growth, market expansion and other related activities. Under these circumstances, a start-up can look to institutional investors called "merchant banks" for financing. Investments at this stage are called late stage venture capital or mezzanine financing. Merchant banks have large amounts of funds available to them, and the lower risk and likely shorter horizon until liquidity of late stage venture financing can be attractive to them. They generally invest in the form of debt, sometimes convertible to equity. As debt investors, one of their principal concerns is that the company has the cash flow to service the debt.

What venture capitalists look for in an investment

Venture capital firms are interested in learning early about potential investments, and use their personal networks to locate such opportunities. In rare instances, a venture capitalist may become involved in the development of a new venture before it is ready for investments of the size and type appropriate for VCs. More commonly, however, the deals seek out the VC, who often maintains a high profile in their investment community – spending significant amounts of time at business events and conferences. The timing of VC financial entry into an opportunity can depend greatly on the supply of and demand for good opportunities by VCs. During the bubble years of 1998 through 2000, very early entry – before real sales – was the norm. Since the bubble burst in 2001, many VCs have been investing more conservatively and later in the opportunity development cycle.

VCs refer to "deal flow" to describe the flow of investment opportunities that they see. Deal flow is the lifeblood of a VC firm. Because they normally see so many business plans, they have tough filters to control their workload. Of the business plans that they see, they finance only a very small percentage (Nesheim, 2000). Just reading a business plan can take hours, and VCs can receive hundreds per month. Some VCs do not accept any unsolicited business plans. They do take seriously business plans brought to them by personal contacts and individuals that they know and trust (Shane and Stuart, 2002). This is one of the reasons that angel investment can be so important for a new venture intent on raising venture capital. A well-connected angel can personally introduce the founding entrepreneurs and their business opportunity to potential VC investors (Fenn and Liang, 1998).

VCs screen deals initially based on such factors as investment stage, investment size, industry sector and geography. If a deal gets through this screening, the first questions asked of the entrepreneurs driving an opportunity are of the form, "So what? Who cares? Why you?"[15]. In other words: What is the core of the opportunity and why is it important? Who are the customers and what pain is the start-up going to solve for them?

[15] These questions have actually been copyrighted by an Ottawa consulting company, Reid-Eddison.

And, what competitive advantage does the start-up bring to the table that will ensure that they can make money with the opportunity? Subsequent discussions elaborate on these themes. VenGrowth, a VC firm active in the region, uses the following decision criteria in evaluating opportunities: people, market, customer traction, competition, product idea, technology and timing. Other VC firms may have somewhat different criteria, but the core elements – experienced managers[16], proprietary products, minimum investment thresholds, and extensive due diligence – are fairly uniform across VC firms (Bhidé, 2000).

Venture capitalists look to a liquidity event like divestiture (i.e., acquisition by another company) or an initial public offering (IPO) to cash out. As a result, a venture capital backed company must plan and work towards such a liquidity event from the start if they wish to raise venture capital.

If a VC is still interested in investing after reviewing the company's business plan and talking with the principals, the VC will issue a term sheet to the company. This term sheet outlines what the VC sees as the basis for a financing deal. If the company accepts the term sheet, then *due diligence* by the VC begins in earnest on the company, the entrepreneurial team, and the opportunity. During this period of due diligence, the company is normally restricted from "shopping the deal around" to other investors for a specified period of time – in a sense, acceptance of the term sheet gives the VC an option to invest. This due diligence period can last several months, and is always a period of high stress and high cost in terms of management attention for the company.

Valuation of a startup, required as part of any deal, is a complex task (Timmons, 2001: chapter 14). Quantitative models are used – multiples of sales, discounted multiples of future earnings, comparison with previous and concurrent deals, previous valuations at angel seed rounds – but many of the factors are qualitative. Qualitative factors focus on

[16] There is a saying in the venture capital community that "the three most important things about a deal are people, people and people." A variation on this is that "the five most important things about a deal are people, people, people, market and product." Good people will find good opportunities and, more importantly, will be able to execute on them.

the match between what is required to be successful and the strength of the core management team, and of future market and technology trends.

Structuring the deal is the last stage before closing the investment. A good deal structure is one in which the goals of the VCs and of the entrepreneurs are aligned to the greatest extent possible. Important considerations include the equity share allocated to each party, the investment instruments used, the staging of disbursements to the company, the allocation of proceeds upon a liquidity event and control over significant company decisions.

The investment instruments used in VC deals have changed over the last few years. In the past, it was usual for VCs to purchase common shares of the companies in which they invested. They became investors on the same level as the founding entrepreneurs, family and friends, and angels. In the last few years, VCs have taken to insisting on convertible preferred shares and the senior liquidation rights that come with them (Kaplan and Stromberg, 2000a). These shares generally have minimum return features of two to three times the original sums invested. This means that when a liquidity event occurs, the VCs get paid before the common shareholders at a minimum payout that is a multiple of their initial investment. In addition, the VCs often participate in proceeds that exceed the minimum payout, parri passu with the common shareholders. In combination, the multiple payout and participation in excess proceeds is often referred as "double dipping". These are very tough terms.

When a deal has been signed, the start-up firm gets a cheque for the initial "tranche" of the VC funds to be invested. It is rare for the full deal amount to be paid in one lump sum[17]. As part of the contract, the start-up must meet defined milestones to get successive tranches of the deal. These milestones take a variety of forms such as product development events, hiring key personnel, and meeting sales targets.

[17] This was not the case during the Internet and dot.com "bubble" when VCs commonly paid out the full amounts of an investment stage in one cheque.

VCs are very active investors. Commonly, they participate as active members of the board; recruiting management and key technical personnel; developing business strategies; monitoring the company's performance; and facilitating subsequent financing rounds (Kaplan and Stromberg, 2000b). VC firms have even been known to function much like the chief financial officers of their client companies if these companies do not yet have adequate internal financial controls and competencies. This is usually short lived, however, and a VC will actively aid in recruiting such competencies for a company. VC-financed firms are more likely and faster to professionalize by adopting stock option plans and hiring external business executives, such as a vice-president of sales, or an external CEO (Hellman and Puri, 2000b).

As stated earlier, VCs will only invest in an opportunity if there is a good likelihood of some liquidity event within their five to seven year investment horizon.

The Rise of the Bay Area Model

Although venture capitalists invest risk equity in new ventures, it has long been commonplace for VCs to demand securities senior to common equity when they invest. These senior securities are either convertible debentures or convertible preferred shares. In contrast, individuals such as founders and angel investors usually buy straight, common shares when they invest in a company.

The use of these senior securities, most often convertible preferred shares, was complicated by the adoption of the "Bay Area model" of VC investing. In the Bay Area south of San Francisco, VCs have for a long time demanded not just convertible preferred shares but also pre-determined conversion preferences for these shares based on the initial investment –conversion preferences, for example, of 2 or 3 times. This model came to the Ottawa region with the influence and the influx of American VCs during the "bubble" between 1997 and 2001.

Consider the following small example that illustrates the issues for early, individual, straight equity investors inherent in the use of shares with conversion preferences. Say a company starts with $2M in straight equity. Sometime later, it considers a VC round of financing. A VC values the company before investing (i.e., pre-money) at $3M. The VC invests $9M so that the company has a value after the VC investment (i.e., post-money) of $12M. The VC has a 3-times liquidity preference on the preferred shares that were received in exchange for the $9M investment. This means that upon the occurrence of a liquidity event (IPO, acquisition or liquidation), the VC gets the first $27M in proceeds before any of the other investors get anything. If the firm goes IPO for $25M, which might otherwise sound like a good deal for the founders, the founders and other initial individual investors would get nothing.

The situation is even worse because VCs sometimes also demand a "double dip." Consider the previous example. If the VC had a "double dip" clause in his deal and the firm did go IPO for $50M, the VC would receive $27M plus 75% (he would own 9/12 of the company) of the remaining $23M.

This situation can get very complicated with successive rounds of VC financing when different preference levels are established for successive issues of preferred shares, each with their own conversion preferences. It can be really disastrous for straight equity investors in the case of a down round – when valuations of the company for a second round are below that of a preceding round. This became very common during the aftermath of the "bubble" – after 2001.

It is frequently the case, however, that a deal cannot be executed without the approval of the common shareholders. In such a case, when by contract a VC would get everything and to not sell the company would mean that it would go under so that no one would get anything, the VC might end up carving off a portion of the proceeds of the deal (10-15%, for example) for the common shareholders to get the deal done.

Venture Capital and the Creation of Value

How successful VCs are at actually fostering innovation in general is surprisingly controversial in the research literature (Callahan and Muegge, 2003). There are three popular arguments. The first is that VCs free innovative firms from capital constraints and add genuine value that helps them become successful. A more neutral stance is that VCs identify the best new ventures, and are the intermediary gatekeepers for funding. The most negative position is that VCs back only conventional ideas. Unconventional innovative ventures are screened out as too risky, and never receive funding.
The research to date is inconclusive.

What is clear however is that VC-backed firms are more successful than non-VC backed firms, both before and after IPO. Venture-backed firms bring product to market faster (Hellman and Puri, 2000b), "professionalize" earlier by introducing stock option plans and hiring external business managers (Hellman and Puri, 2000a), time IPOs more effectively to the market (Lerner, 1994), and have higher valuations at least five years after IPO (Gompers and Brav, 1997). Venture-backed IPOs pay lower fees and are less under priced (Megginson and Weiss, 1991).

Causation, however, is more difficult to establish. Do venture capitalists add value that makes it more likely for their portfolio firms to succeed, or are they simply good at picking winners? Research suggests that VCs do have some impact on their portfolio firms (Hsu, 2000, Kortum and Lerner, 2000). Other studies imply that there are limitations to the value added by VC influence. Ruhnka, Feldman, and Dean (1992) investigated the strategies employed by 80 venture capital firms to deal with the "living dead" investments in their portfolios – ventures that were self-sustaining but failed to achieve levels of growth or profitability necessary for attractive exits such as IPO or acquisition. Venture managers were able to achieve a successful turnaround or exit in 55.9% of living dead situations, regardless of the age of the VC firms, their size, or the relative availability of investor personnel for monitoring investees. From the invariance of this result, the authors argue that the causal factors were outside VC control.

Bhidé (2000) argues that:

> *"VC-backed entrepreneurs face extensive scrutiny of their plans and ongoing monitoring of their performance by their capital providers. These distinctive initial conditions lead them to pursue opportunities with greater investment and less uncertainty, rely more on anticipation and planning and less on improvisation and adaptation, use different strategies for securing resources, and face different requirements for success."*

This would suggest that the venture capital process may actually screen out the most significant innovations in favor of minor variations of what has come before. Other research suggests that venture capitalists frequently engage in "herding" – making investments that are very similar to those of other firms.

During the Internet and dot-com "bubble" of the late 1990s and early 2000, many startup ventures received large disbursements of very early venture capital funding. Since the collapse of the bubble, anecdotes have emerged describing the destructive effects of such large amounts of early money. The business model of a startup venture is like an untested hypothesis – the real test is making a profit from paying customers. Availability of early money can hide problems in a business by delaying such a test. Some very early stage startups redefined success in terms of financing – achieving the first (or the next) venture capital investment round. Bootstrapping, the creation of a business without significant outside financing, is again becoming popular because of the relatively limited supply of venture capital money – and it may not be a bad development.

The differences between bootstrapped and “big money” startups are summarized in Table 2. Bootstrapping forces focus on cash flow and the immediate needs of customers in niche addressable markets. Freed of cash flow constraints, big money startups can try for highly engineered product “home runs” with a view of striking it rich and cashing out. Big money allows for significant compensation packages, so the personal sacrifice of

principals can be very low. When one reads about big money startups, the news all too often centers on their financing progress rather than success with real customers.

Table 2: Differences Between Bootstrap and Big Money Startups
(goes about here)

In summary, venture capital would appear to at least help bring innovation to market. However, the selection process may not always identify and fund the most significant innovations, and especially in times of abundant supply, there may be disadvantages to "big money."

Four Eras

The Early Years (before 1990)[18]

The only local venture capital operation in the early years was Noranda Enterprises. Companies looking for venture capital investment either dealt with Noranda or "put on a suit and tie and went to Toronto." Noranda Enterprises started out within the treasury department of Maclaren Power and Paper Company. Owned by an Anglophone family, headquartered in Montreal and very profitable, the company looked to venture investments in the early 1970s as a means of diversification particularly given the rising separatist threat in Quebec at the time. Doug Cameron headed their venture capital operations and became well known in the Ottawa business scene.

In 1979 Noranda Inc., a very large integrated mining and metals company acquired Maclaren. Maclaren continued to operate very independently, and their venture capital operation continued under the direction of Cameron. In 1983, the venture capital operation was set up as a separate unit named Noranda Enterprises headed by Cameron. Rick Charlebois who had joined Maclaren in 1980 also went with Noranda Enterprises. Noranda Enterprises remained the only local venture capital operation through the 1980s. Their first venture investment was in 1973 in Lumonics, an Ottawa company, specializing in the application of industrial lasers. The second was with Mitel in 1975. Other local investments included DY 4, Cognos, Kasten Chase, Simware, Norpak and Cadence. Noranda stopped investing around 1989 and shut down in 1993.

The overall role of venture capital in the region during this era can be illustrated through the experiences of the region's early "anchor companies." These include Nortel Networks and its former R&D subsidiary Bell-Northern Research, Mitel , Newbridge, Corel, JDS, Cognos, CDC, Leigh Instruments, DY-4, Gandalf, Systemhouse and Lumonics.

[18] A principal reference for this section was Pappone, J. (2000). Timeline Series: Boomtown. *The Ottawa Citizen, Sep 24, [Final Edition]*, p. C.4

Nortel has had the largest presence of any technology company in Ottawa for many years. An integrated telecommunications equipment supplier, it started out as Northern Telecom. Until 1996 it had an R&D subsidiary named Bell-Northern Research (BNR) that was jointly owned by Northern Telecom and Bell Canada. BNR ceased to exist as a separate subsidiary and was integrated piecewise into the operating divisions of Northern Telecom during a corporate reorganization in which Bell Canada divested itself of Northern Telecom and Northern Telecom changed its name to Nortel. The name was changed again to Nortel Networks when Nortel acquired Bay Networks in 1998.

In the early years, Northern Telecom and its principal Ottawa presence BNR were supported by captive sales to the Canadian Bell system of telecom carriers (BCTel, Alberta Tel, NorthwestTel, SaskTel, Manitoba Tel, Bell Canada, QuebecTel, NBTel, MT&T, IslandTel and NewTel). As a large, well-established public company, it received no venture capital investment while establishing itself in the Ottawa region.

Mitel Networks was a very different story. It was started in 1972 by two entrepreneurs from Great Britain, Michael Cowpland and Terry Mathews, who left Nortel in the wake of the failure of its subsidiary, Microsystems International. An appealing story is that Cowpland and Matthews were going to import and sell a "mulch-as-it-mows," environmentally friendly lawn mower and that Mitel was a contraction of Mike and Terry Lawnmower. The lawnmowers got stuck in transit and did not arrive until the fall. Mitel's first actual product was a tone receiver (an electronic device used to translate musical tones in touch tone phones into electronic signals for telephone systems –based on Cowpland's PhD thesis at Carleton University). Mitel focused on customer premises telecommunications equipment – PBXs and key systems. A U.S. regulatory decision in 1976 determined that businesses could own their own telecommunications equipment. Mitel was successful very quickly.

Mitel used venture capital to get started. Mitel's first round of financing was by the founders, Mathews and Cowpland, and some local angel investors. The second round of

$100K came from Helix Investments of Toronto headed by Ben Webster. A third round of about $200K came from Maclaren. Subsequently, Mitel completed an IPO on the Toronto and Montreal Stock exchanges in 1979 and then got listed on the New York Stock Exchange in 1981.

British Telecom acquired Mitel in 1986, and Mathews and Cowpland went on to found Newbridge and Corel respectively. Neither of these new companies used venture capital. Both were financed by their founders from the proceeds of the sale of Mitel.[19]

Newbridge started up in the spring of 1986. Sod turning for its new headquarters took place on April 1 1987. Mathews used $14 million of his own money to start Newbridge. Some other individuals invested but there was no VC money used. During its early years, however, Newbridge also received $15.8 million in grants and repayable loans from Industry Canada, a department of the Canadian federal government. Newbridge subsequently repaid these funds. Newbridge became a public company in July 1989.

Cowpland started Corel in the same way – with his own funds. Corel started in 1985 before the BT acquisition of Mitel became final. Cowpland came close to taking Corel public based on a business plan focused on desktop publishing. The plan was to purchase laser printer engines and computers and tie them together with proprietary software for desktop publishing. This IPO effort was withdrawn at the last minute. When Corel Draw became a big software hit, Corel did complete its IPO in November 1989.[20]

Cognos, a world leading company in business intelligence software, was founded in 1969 as a consulting company with the name Quasar Systems focused largely on federal government contracts. In the early 1980s they made the difficult transition to become a product company. Its first product was Powerhouse, a 4th generation platform/language for building corporate IT solutions, that Cognos still sells. As product revenues ramped up it sold its consulting division. In 1982, Maclaren invested about $2 million in Cognos

[19] In1998, Mitel acquired the Plessey semi-conductor division of GE Co. PLC of Britain for $225M (US). In February 2000, Matthews bought the Mitel name and communications systems division from Mitel that subsequently been renamed itself Zarlink Semiconductor.
[20] Corel was acquired by Vector Capital in the spring of 2003.

just before Maclaren set up as Noranda Enterprises. Cognos went public in August of 1986. At the time of the public offering, Michael Potter (the CEO) owned 44 per cent of the company; Noranda Enterprises Ltd. owned 26 per cent; and 400 individuals – mostly employees –owned the balance.[21] Doug Cameron of Noranda remained a prominent member of the Cognos Board for many years afterwards.

SHL Systemhouse was founded in 1974 by Rod Bryden, John Kelly and Jack Davies. Kelly and Davies provided funding and "sweat equity"; Bryden provided the other half of the financing.[22] Bryden personally put up $50,000 plus $200,000 from a holding company owned by himself and a partner. Between the founding of the company in 1974[23] and initial public issue of shares in 1980[24], a VC company named Charterhouse – a U.K. based VC headed in Canada by John Hardy – invested a small amount in Systemhouse.

Des Cunningham and Colin Patterson founded Gandalf on their credit cards. Gandalf was a classic example of how to patiently grow a real business and then go public when critical mass was reached. No VC capital was used. The business was bootstrapped using retained earnings and bank borrowings. The company went public in 1981 in a cross border IPO that was a first for an Ottawa founded company. Gandalf dealt with a large U.S. VC later after its merger with Infotron in 1991. The VC was helpful but by that time the ailing Gandalf was a workout problem that eventually failed. In July 1996, Gandalf sought protection from its creditors and sold its most valuable assets to Mitel.

Computing Devices of Canada (CDC) was an Ottawa original, founded in 1948 by two Polish immigrants, George Glinski and Joe Norton.[25] It got its start manufacturing a

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[21] Chrom, S. (1986). Cognos Inc. set to go public. *The Ottawa Citizen. June 28 [FINAL Edition]*, p. E.7
[22] Ottawa Business Journal Staff (2003). CEO of the YEAR 2000: Rod Bryden – Ottawa's consummate risk-taker, *Ottawa Business Journal, Tue, Nov 18, 11:00 AM EST.*
[23] The company that became Systemhouse in 1974 was actually founded in 1968 by John Kelly, Jack Davies, and Turston under another name, see 20.
[24] CBC. Rod Bryden: Dealmaker. (http://www.ottawa.cbc.ca/ottawanews/bryden/chronology.html, accessed Dec 11, 2003)
[25] Smillie, K. Computing Devices I, from The Computer and Me: A retrospective look at some computers and languages. (http://www.cs.ualberta.ca/~smillie/ComputerAndMe/ComputerAndMe.html, accessed Dec 2, 2003)

position and homing indicator that kept track of an aircraft's position and indicated the return route to its base. A large contract for the Kicksorter, a digital pulse counter designed at the Chalk River Laboratories of Atomic Energy of Canada Limited, had a significant influence on the company's growth. A large number of these devices were purchased by AECL from 1957 until 1963 when they were replaced by an early version of the DEC PDP minicomputer. CDC was founded before the development of organized venture capital. Investment capital for the company came from Peter Mahoney who had successful movie projection and electronics businesses. CDC was sold to Control Data Corporation in 1966 and then was acquired by General Dynamics from Control Data in 1998.

DY 4 was founded in 1979 by four engineers – the "dynamic foursome." DY-4 started out as a manufacturer of microcomputers – its Dynasty line of eight bit CPM machines. It pioneered the use of local area networks and early in the 1980s had the largest installed base of LANs in the Canadian computer industry. However, in 1981 IBM entered the PC market with 16 bit DOS based machines which quickly established market dominance and became a de-facto industry standard. DY 4's computers were not compatible with the IBM standard and sales dropped off rapidly. Just prior to the decline in sales for their microcomputers, DY 4 was involved in the development of a speech synthesizer and in a naval project for the Department of National Defence. These contracts required expertise in the development of board level electronic systems using the VME design standard. DY 4 was Venture funded by CBC Pension funds in 1981, 1983 and 1989 and by Noranda Enterprises in 1983 and 1989.[26] Noranda was particularly important to DY 4 when the company suffered a difficult crisis and almost went out of business. The company went public in 1993. Noranda Resources and the CBC Pension Fund owned about 50% of DY 4 when it went public.[27] DY 4 was acquired by C-MAC in 2000.[28]

[26] Venture capital firm SB Capital Corp. of Toronto was also a shareholder.
[27] Lacasse, D. (1993). Growing pains; Dy 4 Systems of Bells Corners makes big splash with investors on first day of going public. *The Ottawa Citizen, Apr 20, Sec. F*, p. 1.
[28] C-MAC itself was acquired by Selectron in 2002.

Leigh Instruments was founded in 1961 by John Shepherd, Chester Mott, Maurice Price and Dick Steacie who left CDC together. It got its start by licensing an NRC crash position indicator. The company was acquired by UK-based Plessey Company PLC in 1988 for $100M. By 1991, it was bankrupt. One of the founders, John Shephard, was married to a Findlay. The Findlay's from Carleton Place were early investors. Maclaren came in later but not as a start up investor.

JDS was founded in 1981 by four Bell Northern Research employees, Jozef Straus, Philip Garel-Jones, Gary Duck, and Bill Sinclair.[29] The company started out designing and manufacturing passive optical components and later branched out to active components. The company grew organically in its early years based on the technological competencies and market knowledge the founders developed while at BNR. The original name of the company was JDS Optical. The name changed to JDS Fitel as part of a partnership deal with the giant Japanese industrial wiring and cable company, Furukawa Electric. JDS had been distributing Furukawa products in North America for some time. Furukawa put up $9M in return for half of JDS, half the seats on the board of directors and a full-time liaison person on staff. It was a "hand shake deal." The deal allowed JDS to ramp up operations as demand increased.

JDS had approached several investors in Ottawa and across North America. "They would ask how much business we were doing. We would say $9M," says Straus. "They would ask to see our business plan to get to $50M. We would say that we don't know how to do a business plan and all we want to do now is to get to $12M. They would say, 'Well, thank you very much but it is obvious you don't have vision.'"

In March 1996 JDS Fitel completed one of the largest initial public offerings (on the TSE) in Canada's history with a $93.7M offering. After a number of acquisitions and a merger of equals in 1999 with Uniphase Corporation of California, JDS Uniphase

[29] Straus joined the company full time five years after its founding. We use in this section the history of JDS wonderfully captured in a two-part newspaper article: Hill, B. (2001). The Four Cooks' Series: Growing pains. *The Ottawa Citizen [Final Edition], Jul 16*, p. B.2; and JDS in the beginning Series: Growing pains. *The Ottawa Citizen [Final Edition], Jul 16*, p. B.1.FRO.

Corporation became a globally dominant supplier in optical components and subsystems. The company has since suffered through the telecom meltdown of 2001 and 2002 but remains a significant force in its markets.

Figure 2: The Share Price History of JDS Uniphase
(goes about here)

Al Buchanan, Gordon Mauchel and Alan Crawford left Leigh Instruments in 1981 to found Lumonics. They licensed laser technology developed in the Defence Research Establishment. Buchanan left the top spot at the company at the end of 1984 to run his own consulting business. In 1985, Lumonics completed a private placement with Canadian and U.K. institutional and private investors that netted $23.8 million. Lumonics issued 1.4 million common shares at $17.50 apiece, with Noranda Enterprise Ltd. - already the company's largest shareholder - grabbing 200,000 of the new shares.[30] In 1987, Noranda resources made open market purchases of between $2.5 and 2.75M in Lumonics shares, bringing Noranda back up to the 30-per-cent ownership level it had held for about 14 years.[31]

Lumonics was acquired in May 1989 by the Japanese conglomerate, Sumitomo Heavy Industries Ltd. Sumitomo purchased more than 95 per cent of outstanding Lumonics shares, including the 31-per-cent stake held by Noranda Enterprises Ltd. Lumonics went public in 1995. The company merged in 1998 with General Scanning Inc. of Watertown, Massachusetts, to form GSI Lumonics. Little of the Lumonics operation is now left in Ottawa

Table 3 summarizes the venture capital involvement in the region's 12 "anchor companies."

[30] Barr, G. (1985). Lumonics to acquire U.S. laser firm. The Ottawa Citizen, Sep 17 [FINAL Edition], p. D.1.
[31] Provencher, N. (1987). Noranda adds to stake in Lumonics. *The Ottawa Citizen, Nov 24 [FINAL Edition]*, p. B.2.

Table 3: Summary of Venture Capital Involvement
in the Region's Anchor Companies
(goes about here)

Coming of Age (1990-1997)

The Ottawa region came of age between 1990 and 1997. The number of tech workers in the region doubled between 1990 and 1996 – to 700 companies and about 41,000 workers.[32] During this period, significant development centred on Terry Matthews and Newbridge, its affiliate program and the U.K.-based venture capital firm, Celtic House, he founded.

The Newbridge affiliates program was a very successful corporate venturing program (Chesbrough 2000). It started in 1993 as Newbridge embarked on a high growth phase. The program was designed to provide an entrepreneurial outlet for Newbridge's best people and to provide a way to make money from technologies that Newbridge had developed but would not pursue internally. The formula was that Newbridge provided an incubator environment (space, IT, Legal, HR, finance) including strategic direction and access to lead customers. Typically Matthews (directly or through Celtic House) provided seed funding for the first 12 to 18 months of development. At the time the companies were founded it was normal for Matthews to own 33%, Newbridge 33% and the founders 33%. A 15 to 20% stock option pool was also maintained for granting to employees so that there was a high degree of employee ownership in the companies. Once the companies had a product developed and some initial customers (at least trials completed), they typically raised additional capital. Newbridge normally maintained a stake of 25 to 40% (depending on degree of strategic importance) as other investors came onboard. The Board of Directors usually included Matthews as Chairman, a senior Newbridge executive, the company CEO, and two independent directors. Matthews also set up Severn Bridge Investments to allow Newbridge employees to invest in these companies.

[32] Pappone, J. (2000). Timeline Series: Boomtown. *The Ottawa Citizen, Sep 24 [Final Edition]*, p. C.4.

Twenty-four Newbridge affiliate companies were set up in this way. Some prominent examples are shown in Table 4. Approximately $1B was added to Newbridge's net income through the affiliates program. Severn Bridge Investments made a cash-on-cash IRR in excess of 80% for Newbridge employees.

Table 4: Prominent Newbridge Affiliate Companies and their Liquidity Events (goes about here)

Because of the success of the Newbridge affiliates, and the role that Terry Matthews played as lead investor, venture capital firms were anxious to invest. Venture capital investments in some of the affiliates (for which data was available) are also listed in Table 4.

Matthews started Celtic House, his own venture capital firm, in 1994 with his own $25M.[33] He also invested the $75M that he realized from his investment in Skystone when it was acquired by Cisco in 1997. Moreover, Matthews reinvested all his Celtic House earnings. Between 1994 and March 2001, Celtic House invested in 40 companies, 6 now public and 10 acquired. By March 2001, a second Celtic House fund was half way through investing $250M. Generally the firm invests in the early stages of a company, looking for a 20% to 25% equity stake. Because of Matthews' experiences as an entrepreneur, the firm has not advocated downside protection agreements, such as ratchets and anti-dilution clauses. It invests in products – no services, portals or application service providers (ASP), and typically avoids consumer products. The firm has invested in companies focusing on Internet infrastructure, telecommunications, wireless technologies and data storage.

The 1990-1997 era was marked by a number of IPOs of local companies. Extraordinarily, ten local companies went public in 1993 alone. Table 5 lists these companies together with VC involvement in them. It is evident from the table that VC

[33] Fellers, C.R. (2001). Celtic House Intl. Crosses the Border. *Venture Capital Journal, March 1* (http://www.findarticles.com/cf_dls/m0ZAL/2001_March_1/70974965/p1/article.jhtml, accessed Dec 4, 2003)

financing was not a critical determinant in most of these companies. Of the ten, only DY 4 and Plaintree had significant VC funding. This may be symptomatic of the fact that between 1989 (when Noranda Resources stopped investing) and 1994 (when Celtic House and Capital Alliance Ventures started up and the Business Development Bank of Canada set up an Ottawa operation) there were no locally headquartered VC firms in Ottawa. It may also be symptomatic of how unattractive VC funds can be. The founder of one of the companies in Table 5 said his company "avoided venture capital like the plague."

Table 5: VC Involvement in Local Companies that Went Public in 1993
(goes about here)

It was during this period that changes in legislation facilitated the development of funds that raised venture capital from ordinary, retail investors. Labour Sponsored Investment Funds (LSIFs) are corporations sponsored by labour organizations[34] designed to invest in small and mid-size Canadian businesses subject to the following criterion:

- Less than 500 employees
- Less than $50 million in assets at the time of investment
- Maximum $15 million investment

Based on the idea that venture capital supports technologies important to Canada's long-term economic well being, the federal and provincial governments offer tax credits to Canadians who invest in LSIFs. The Federal Government offers a 15% tax credit on a maximum LSIF investment of $5,000 each year. Most provincial governments across the country offer an additional 15% tax credit on eligible LSIF investments, creating a total federal and provincial tax credit of 30%. The Ontario Government offers a 20% tax credit on research oriented investment funds (ROIF) LSIFs, generating a total of 35% in tax credits. If investors redeem their LSIF investment within 8 years, the tax credits are clawed back by the governments.

[34] Some of these sponsorships are referred to as "rent-a-union" associations by critics. See The CAW Research Department (1999). Labour-Sponsored Funds: Examining the Evidence. February. (http://www.caw.ca/whatwedo/research/sponsored/index.asp, accessed Dec 5, 2003)

An LSIF is also a Labour Sponsored Venture Capital (LSVC) Corporation, however the opposite is not the case. In order for an LSVC to offer Ontario tax credits or refunds to investors then it must also be a LSIF. These types of retail, tax related venture capital funds now account for a significant percentage of all venture capital raised in Canada[35] and figure prominently in the Ottawa region. VenGrowth has several such funds. Working Ventures was a national VC firm based on such funds that was active in the late 1990s in the region.

Capital Alliance Ventures Inc. (CAVI) is a local LSVC founded in 1994 by Denzil Doyle and Rick Charlebois. Doyle was a pioneer manager in the region. He worked for CDC and started a successful Canadian operation for Digital Equipment Corporation in the 1960s. Charlebois worked with Doug Cameron at Noranda Enterprises. CAVI raised significant amounts of capital[36] and invested in a number of local firms.

Table 6 describes the investment activity in 1996 of VC firms active in the Ottawa region. Note that the figures are not limited to investment in regional companies.

Table 6: 1996 Investments by VC Firms Active in the Region
(goes about here)

The Bubble (1997-2001)

The acquisition of Skystone by Cisco in June 1997 for $89M (U.S.) in Cisco shares and cash[37] marked the start of the "bubble economy" in the Ottawa region. The company had been in business for only a couple of years. It was developing optical networking chips.

[35] TD Waterhouse, Labour Sponsored Investment Funds, http://www.tdwaterhouse.ca/mutual/labour_funds.jsp, accessed Dec 9, 2003.
[36] Because LSIFs and LSVCs are eligible as tax-deductible retirement savings most funds are raised in January and February. CAVI raised $5M in 1995, $25M in 1996 and $10M in 1997. Source: Personal interview and McIntosh, A. (1997). Milkyway stake hinders Ventures fund: Ottawa-based labour investment fund languishes behind pack. *The Ottawa Citizen, Aug 26 [FINAL Edition]*, p. C.3.
[37] Skystone was Cisco's first acquisition in Ottawa, and formed the foundation from which Cisco expanded to approximately 400 employees in the region.

The acquisition made its founder Antoine Paquin a household name in the region. If so much could be made in so little time, the "game had changed."

The VCs who had invested in the company and shared a big payday were Celtic House[38] and a prominent Boston firm, Furneaux & Company run by David Furneaux**.** Furneaux & Company later changed its name to Kodiak Venture Capital. Furneaux was from the States, and looked very smart on the Skystone deal, so the sale of Skystone was important for another reason – it marked for the business community the start of significant U.S. VC involvement in the region.

Kodiak invested in 12 local companies including Extreme Packet and Philstar. In March 2001, Dave Furneaux, Kodiak's managing general partner, said the firm would soon close a second fund worth between $275 and $300M (U.S.), and that it seemed likely a large portion of it would work its way north. "Ottawa is where it's happening, and we're committed to this area," said Furneaux.[39]. As mentioned above, the investment by the American VC firm, Mohr Davidow, of $6.5M in Trillium Photonics in 2000 was regarded by the VC firm as the first of $100M it would invest in the region.

During this period, more than 20 Ottawa-area technology firms – including Extreme Packet Devices ($600 million), Innovative Fibres ($260 million) and Cadabra Design ($190 million) – were sold to multinationals for huge valuations. Paquin, for example, sank part of his Skystone winnings into Philsar Semiconductor, a wireless chipmaker he sold to Conexant in early 2000 for roughly $280 million.

Table 7 shows the amounts of venture capital investment in the Ottawa region since 1997. Remarkable is the steep rise in investments between 1998 and 2000. By 2002, over a quarter of every dollar of VC investment in Canada was invested in the region.[40]

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[38] In 1997, Celtic House invested $4.5-million U.S. in Skystone -- good enough for a 19 per cent stake in the company. Source: Bagnall, J. (2000). The Deal That Changed the Rules...and Transformed Ottawa. *The Ottawa Citizen, Monday, September 25*.

[39] Source: Kodiak assures IPO market will rebound. *Ottawa Business Journal, March 6, 2001*.

[40] This percentage has likely decreased since 2002 because life sciences have increased their share of VC investment, and the O-C region is less strong in these areas than it is in software, electronics and optics.

Also remarkable is the equally dramatic increase in the average size of the deals, from an average of $1.8M (Cdn) in 1998 up to $17.1M (Cdn) in 2001.

Table 7: VC Investing in the Ottawa Region
(goes about here)

The dramatic increase in the size of the deals done during this period is even more apparent in Table 8. In the table only deals of $30 million (Cdn) or more are listed. There were none in 1998 and 12 in 2000.

Table 8: VC Deals in the Ottawa Region: $30M (Cdn) and Over
(goes about here)

This period marked the establishment of two local VC firms: Skypoint Capital founded by Leo Lax[41] and Andy Katz in 1998, and Venture Coaches founded by Claude Haw in 2000. Lax and Haw had been managers at Newbridge and heavily involved with the affiliates program. Katz had been with a local accounting firm, Deloitte & Touche, and had handled the Newbridge account from the early years.

In 2001, VenGrowth, which is headquartered in Toronto, opened an Ottawa office with the appointment of Pat DiPietro and Mark Janoska as partners.

The environment in which VCs were investing is tellingly described by the following recent quote from a local VC.

> *If you go back to the 1999 – 2000 timeframe, people protected deals. Doing a seed investment, we would use code words. Right now there is a company in Montreal called (company name), which hopefully we will invest in shortly. Back then, not only would I not say this out loud, I wouldn't have shown it to you. I wouldn't show anyone. We would have a code word because the mere existence of an opportunity you were looking at –someone would go and steal it. They*

[41] Lax was also an investor in Skystone.

would think nothing of that. They would say: 'You don't need that, here's our term sheet.'

VCs had to act quickly or investment opportunities would disappear to the competition. As a result of this pressure, VCs also shortened due diligence periods.

VCs were also driving companies very hard during this period to grow quickly. Consider the following quote from the lead founder of a local startup during this era:

"We were under a lot of pressure to grow fast and do high-profile public relations. One of our competitors had already gone public on much less revenue, and our California-based VC wanted to see us follow suit quickly. My PR expenses and airline bills were astronomical. At the same time, we were trying to run a business. The bubble was pushing our burn-rate. Once you get on that ride, you can't get off. You couldn't ask if it makes sense for a company that's only a year old to go public. Those conversations went nowhere."

After the Bubble (since 2001)

For Ottawa, the first sign that the bubble would end is marked by the collapse of demand for Nortel products in early 2001. At the end of 2000, Nortel had a global workforce of 95,000 employees, with 16,000 based in Ottawa. In 2001, Nortel announced four separate restructuring plans to reduce the workforce and control spending. By 2002, Nortel had streamlined operations to a workforce of approximately 37,000, including 6000 positions in Ottawa[42]. They laid off 10,000 employees in the region.

The differences in VC investing before and after the bubble burst are illustrated by comparing two companies, Espial and Serence. Espial was founded in 1997 by three friends in their 20s, Allan Wille, Jaison Dolvane and Kumanan Yogaratnam. Espial was developing embedded software products to allow customers to surf the Web on their

[42] Nortel Networks Corporation (2003), Annual and Quarterly Reports, 1993-2003

televisions through set-top boxes. The company obtained significant angel funding in 1998, and $12M in funding in the third quarter of 2000 from the American VC firm Greylock and from Invisible Hand, a private investment fund and incubator out of New York. A second round of VC funding totaling $16.5M was provided by VenGrowth, Greylock, Sussex Capital and Invisible Hand. VenGrowth led this round with a $12M investment.

In 2001, after the bubble burst, a trio of former Espial employees including Wille started another company, Serence, focusing on a software platform for providing real time desktop information awareness and notifications. Older and more experienced from the Espial venture, the founders of Serence never did find financing.[43]

There have been a number of striking failures in the post bubble era of startups financed with huge amounts of VC money. Table 9 lists some of the most prominent.

Table 9: Prominent VC Funded Failures Since 2001
(Goes about here)

Just these seven companies made a large dent in the $3.3B invested in the region by VCs between 1998 and 2002. Many more VC backed companies in the region have gone out of business or are having great difficulty staying in business.

During this period, angel investors have been squashed in many down rounds. They have been hurt by the liquidity preferences demanded by VCs since 1997 as explained above. As a result, angels have stopped investing during this period.[44] Most have left the scene permanently and the fragile angel networks that had been built up over the preceding 20 years have been significantly weakened. This has affected deal flow to the VCs. This

[43] Their difficulties were well documented by The Ottawa Business Journal, http://www.ottawabusinessjournal.com/reports.php
[44] Coralie Lalonde, Katsura Investments, presentation at Carleton University, November 10, 2003.

has impelled some of the VCs to move upstream and establish angel kinds of operations.[45]

There was also a new local VC firm founded during this period. StartingStartups began its life as an incubator, helping very new companies. In early 2002, the firm started to raise its first labour-sponsored fund in an attempt to become a venture capital firm for seed and early-stage companies in the Ottawa and Kitchener-Waterloo areas. Its incubator, which had hatched five companies, was shut down and the firm changed its name to Axis Capital. It currently has seven portfolio companies managed in two separate funds.

Venture capitalists have suffered through the last two or three years along with local technology companies. Because labour sponsored funds (LSIFs and LSVCs) target retail investors, their operations are heavily regulated and their funds are valued on a regular basis. Valuations of their non-marketable stakes in private companies are recorded at cost and re-valued if different values are established by subsequent investment rounds or in the case of a more mature company, valuation on the basis of sustained earnings, cash flow or sales.

Table 10 presents returns over the last few years for labour sponsored funds active in the region. Notice first how seriously these VCs have suffered since 2000. Both Capital Alliance Ventures and VenGrowth I raised money in the 1990s and invested during the bubble. Over the last three years, each has lost about 17% per year for their investors. Contrast this performance with that of Axis Capital's Series 1 fund that raised money more recently and recorded a 22% gain in the last year, a year during which the stock markets in general have been on a bull run. Timing has been very important.

Table 10: Recent Returns for Labour Sponsored Funds
Active in the Ottawa Region (As of Oct 30, 2003)
(goes about here)

[45] Claude Haw, Venture Coaches, presentation at Carleton University, November 18, 2003.

It is because of these recent returns that there has been consolidation in the VC industry. This consolidation is likely to continue for some time. Locally, CAMI, the firm set up by Doyle and Charlebois to manage CAVI, merged with Technology Investments Management Corporation (TIMCO) of London, Ont. in January 2003 – the merged firms operate under the TIMCO name. Even more recently, Venture Coaches merged with Skypoint - the merged firm operates under the Skypoint name.

Has Venture Capital Created Value in the Region?

So, has venture capital created value in the region? We would like to summarize answers to this question using a dialogue format – a possible dialogue between Mr. Positive and Mr. Negative:

Mr. Positive:
First I would like to say that venture capital played a large role in the early years of the region – particularly Doug Cameron of Noranda Resources. Noranda invested in Cognos very early, for example, and Cameron remained a Director on their Board for many years. Now Cognos is Canada's preeminent software company with sales of over $500M (U.S.) per year, and a dominant position in their market.

Mr. Negative:
I will give you the Cognos example – a great one. But overall, venture capital was not that important in the development of the region in the early years. Much more important were the National Research Council, the Defense Research Establishment, and the presence of Bell Northern Research and its forerunners. And it was really entrepreneurs who built the region's tech industry. Remarkably, many of them were immigrants. In fact, Noranda shut down in the late 1980s. Cognos was a real successful investment for Noranda, as were Mitel, DY4 and perhaps Lumonics, but they had lots of failures as well. The four VC successes that I just mentioned were significant but certainly not the whole story in the early years. Besides, the amounts of money invested by VCs during this period were very small by today's standards.

Mr. Positive:
Well what about the VC operation started by Terry Matthews in the 1990s – Celtic House? It made a lot of money.

Mr. Negative:

Terry made a lot of money for himself and for other investors in Newbridge and in the affiliates program. But that was early. Celtic House made a lot of money through investments related to the Newbridge affiliates program. But these companies were heavily supported by Newbridge, so the Celtic House success is not representative of the VC industry.

Mr. Positive:

How about the $3.3B that VCs brought into the region over the last 5 years – that has had a tremendous impact.

Mr. Negative:

Yes, I live here, so for sure it has benefited the region – that is a lot of money. But it has had some negative effects as well. For entrepreneurs, getting VC money itself came to signify success. It was the start, however, of their problems. Money from customers is the key, and if a lot of VC money kept a company from testing its business model with real customers, then the VC money was a bargain with the devil. Even a big initial valuation did not mean much for the founders of a company. When they went for a next round and the company's valuation was down, they would get squashed by the conversion preferences, ratchet clauses, etc. that the VCs would demand. In a situation like this, and you have to admit that it was fairly common here, the founders and employees might have stock options but they would never be in the money.

Mr. Positive:

But there was a tremendous infrastructure built during the period of intense VC activity – 1999, 2000 and 2001. Accountants, lawyers, business advisors – the number of people who knew how to do deals, write contracts, etc. increased a lot. The region has a lot of this kind of expertise now. It is much easier to do deals.

Mr. Negative:

Yes, that's a good point. Let just hope, though, that business picks up soon. If not, a lot of this expertise is going to be lost. And what about the angel networks that built up over years here. There were a lot of private investors in Ottawa, many of whom had made money in tech business and wanted to give back to the community. That network has been seriously crippled. It will be interesting to see how the VCs adapt to this. Can they do some of the really early stage angel financing themselves? I doubt it.

Mr. Positive:
That is a problem. But there have been some really promising VC developments locally: CAVI, Venture Coaches, Skypoint Capital, Axis Capital, permanent offices for VenGrowth and BDC. A lot of the banks have VC operations now.

Mr. Negative:
Well, CAVI is now managed by TIMCO out London, Ont., and Venture Coaches has just merged with Skypoint. VCs everywhere are hurting because of the downturn in the economy in 2001 and 2002, given the amounts of money that they invested during this period and just before. Ottawa VCs are in the same boat. There will be more failures and consolidations. The word is that everyone is suing everyone else in town – there is a lot less money on the table than everyone hoped for. And as for banking based VCs, even the VC community doesn't give them good marks. Companies need investors who understand how to run a business. When a crisis occurs in a business, VC reps on the board need to know what to do. Just cutting spending is not a solution most of the time. That can do real damage to a company struggling to survive. And what's more, over the past few months almost all of the banks have announced the closure of their VC arms.

Mr. Positive:
But the Ottawa region is on the world map now. American VCs know about the wealth of technical talent here, and they will be back.

Mr. Negative:

That's true to an extent. But they sure are gone now. They look after some of their old investments, but there is no new U.S. money in town now. Lets hope that they have long memories for the good times, and come back when things turn up.

So, has venture capital created value in the region? The answer is not a straightforward yes or no. In interviews with local VCs we asked the following question: How would you rate the contribution of venture capital to the building of technology based companies in the Ottawa region? We leave you with the opinions of three local VCs themselves when asked the question. The first is really negative:

I might be being a little bit too hard on them. But I haven't seen much value creation;

the second more balanced:

First and foremost you need the entrepreneurs. You can have all the venture capital in the world but if you don't have a Terry Matthews to help set the stage and show what can be achieved you don't have anything…I would rank the entrepreneurs substantially ahead of the venture capital…I think you have to be very careful the way you apply venture capital. Is it important? Absolutely, but I would always rank the entrepreneurs way ahead of the venture capitalists;

and the third the most positive:

I think it has been phenomenal. Even for the companies that blew through a lot of money in a short period of time, it still creates jobs; it attracts talent to the region. Three billion in the last 3 years is the number. Three billion has incredible spin-off effects. The accounting firms have more people and more expertise because of that three billion. Law firms have more expertise…We're able to attract people back…Even the disasters like Zenastra that raised an incredible pool of capital and did some really silly things, like allocating $40 million to a manufacturing plant when the industry was going the opposite direction, produced some people who got some scars out of that and went, "Gees, I don't want to do that again. We made a couple of mistakes there." Even the disasters produce some good results back into the community.

There are real opportunities for further research on the core question of this chapter. In *The Innovator's Dilemma*, Christensen (1997) distinguishes between disruptive and sustaining innovations. Disruptive innovations target markets that are potentially very large but are hard to specify with precision early in development. Sustaining innovations target well defined markets with well established customer benefit criteria. In his new book, *The Innovator's Solution,* Christensen uses the distinction between disruptive and sustaining innovation to argue that companies developing disruptive products and services should "be patient for growth, not for profit" (Christensen, 2003, p.258). Some research questions based on this idea are: With what frequency do Ottawa startups attempt disruptive innovation? Do VCs in the region treat disruptive and sustaining opportunities differently? Are these VCs patient for growth but not for profit when providing financial support for disruptive innovations? Are the contributions of VCs to the development of disruptive innovations different from their contributions to the development of sustaining innovations?

There is also fundamental work to be done on measuring the contributions of VCs to their investee companies. This issue is related to issues involved in manager contributions to shareholder value in companies. Considerable progress has been made in this area (see, for example, Rappaport, 1997).

Another set of research issues arise from the differences and similarities among VCs: independent VC firms and bank-based VCs; Canadian and American VCs; VCs that generate retail labour sponsored funds and VCs that generate financing in more conventional ways from corporate investors and pension funds. Do bank-based VCs operate differently than independent VC firms? Do they add more or less value to their investee companies? Have the contributions of American VCs that operate in Canada been different than Canadian VCs?

There is some urgency for researching these questions. The business history of the region is not being captured in a systematic way. Many of the founders and managers of

the early companies who have first hand knowledge on these questions have already died, or retired and moved away.

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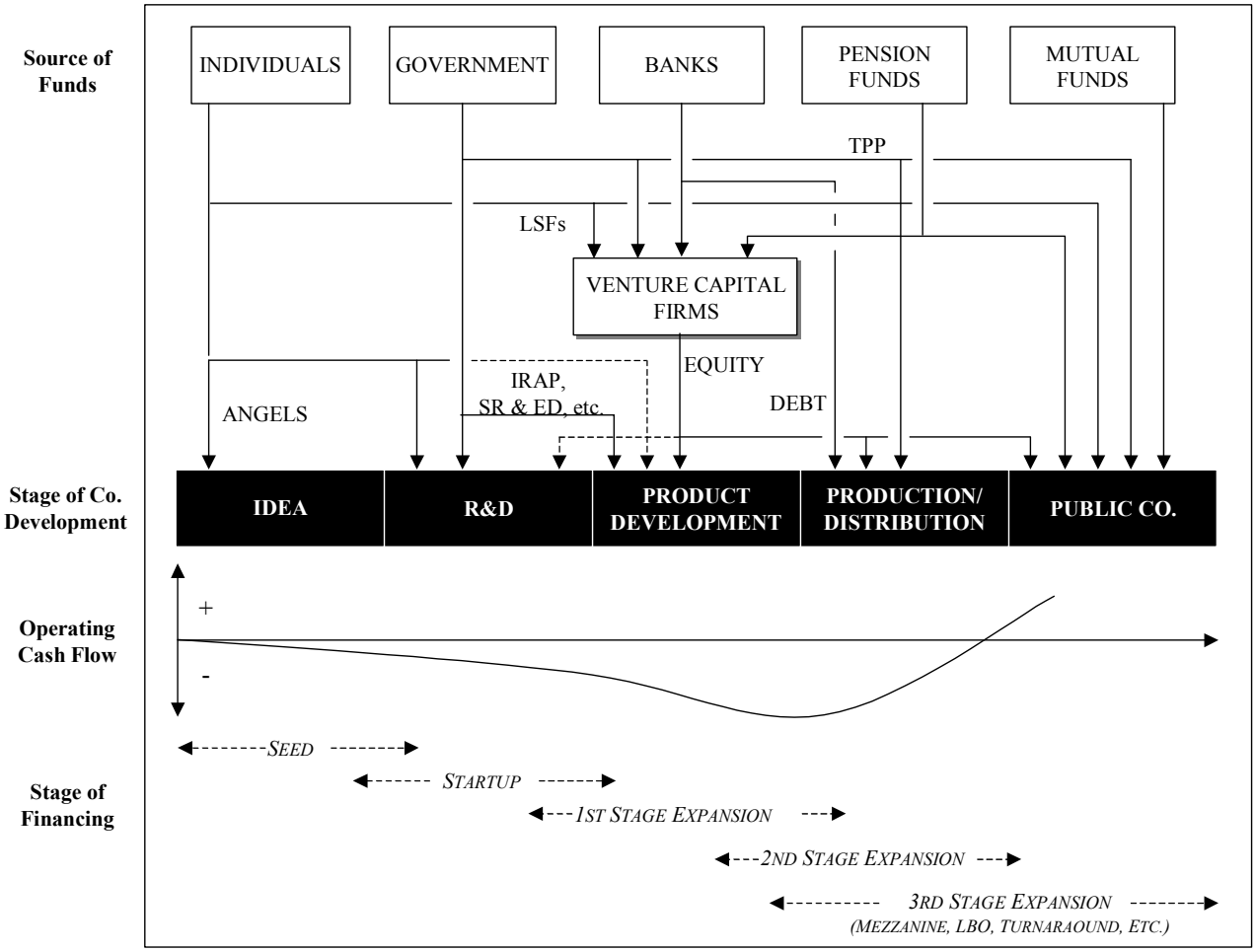
Figure 1: The Role of Venture Capital in the Financing of Startup Companies



Source: Denzil Doyle, private communication, adapted
The federal government's Technology Partnerships Program (TPP), Industrial Assistance Research Program (IRAP), and Scientific Research and Experimental Development (SR&ED) are described in the text. Labour sponsored funds (LSVs) are also described in the text.

Figure 2: The Share Price History of JDS Uniphase

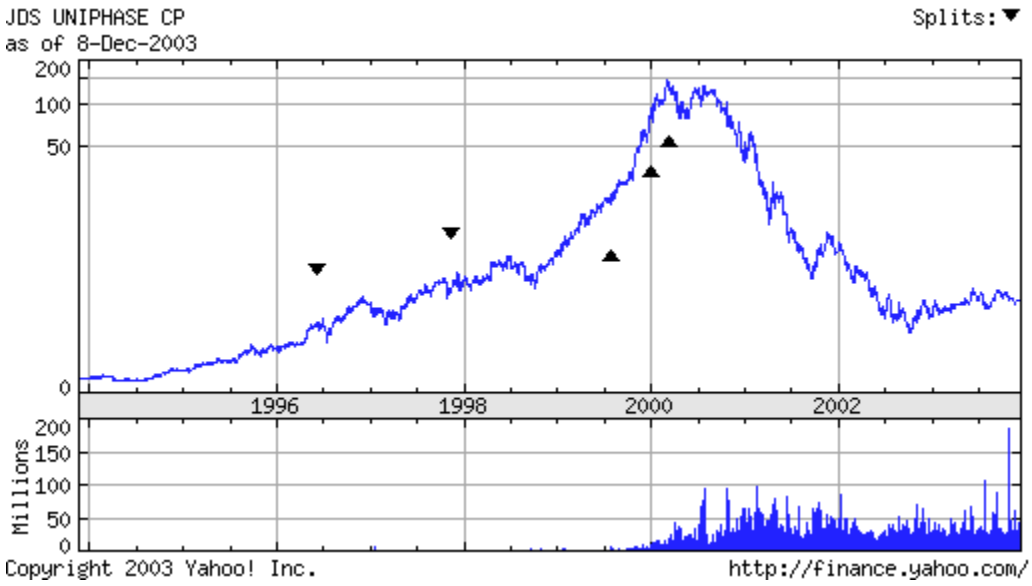


Table 1: Principal Shareholders in Tundra Just Prior to IPO

Shareholder	Percentage of share ownership
Newbridge Networks	37.1%
VenGrowth	17.8%
Adam Chowaniec	2.8%
James Roche	4.0%
All other directors and senior officers	6.1%

Source: IPO Prospectus, January 26, 1999, SEDAR.com.

Table 2: Differences Between Bootstrap and Big Money Startups

	Bootstrap	Big Money
Money	earn it	other people's
Initial focus	customers	exit
Product	incremental	highly engineered
Markets	niche	$1B
Org. Structure	fluid	rigid
Time Horizon	near term	long term
Media Profile	low	high
Personal Sacrifice	high	low

Table 3: Summary of Venture Capital Involvement in the Region's Anchor Companies

Company	Lifespan as an Independent Company in Ottawa	Use of venture capital
CDC	1948 – 1966 (acquired by Control Data Corp.)	none
Nortel/BNR	1959 – present (Northern Electric Research and Development Laboratories established in Ottawa in 1959)	none
Mitel	1972 – present (acquired by British Telecom in 1985 for $322M, name and some assets later re-purchased by Terry Matthews in 2001)	$100K from Helix, $200K from Maclaren
Cognos	1969 – present (started as Quasar, changed name to Cognos in 1982)	yes Noranda Enterprises Ltd. owned 26 per cent when Cognos went public
DY 4	1979 – 2000 (acquired by C-MAC for $250M, itself acquired by Selectron in 2002)	yes Noranda Resources and the CBC Pension Fund owned about 50% of DY 4 when it went public in 1993
Corel	1985 - present	none
Newbridge	1986 – 2000 (acquired by Alcatel for $7.1B)	none
Lumonics	1970 – present (acquired by Sumitomo in 1989, merged with General Scanning in 1998 to become GSI Lumonics, little left now in Ottawa)	yes Noranda Enterprises was an important early investor
Leigh Instruments	1961 – 1991 (acquired by UK-based Plessey Company PLC in 1988 for $100M, bankrupt in 1991)	none Maclaren was a late stage investor
Gandalf Technologies	1970 – 1996 (bankrupt)	none
SHL Systemhouse	1974 – 1995 (acquired by MCI for $1B)	very little
JDS	1981 – present (merged in 1999 with Uniphase)	none

Table 4: Prominent Newbridge Affiliate Companies and their Liquidity Events

Affiliate	Some VC Investments in 1998*	Liquidity Event
CrossKeys Systems	Capital Alliance and others - $10.8M	1997, IPO, 22X
Tundra Semiconductor	BDC; Capital Alliance; VenGrowth[a] – $3.4M	1999, IPO, 78X
Cambrian Systems	VenGrowth – at least $25M	1998, acquired by Nortel, 31X, 21 months
Abatis Systems		2000, acquired by Redback Networks, 83X, 23 months
TimeStep Corporation	Altamira, Celtic House – $6,000,000	1999, re-acquired by Newbridge, $100 million
Vienna Systems	none	1998, acquired by Nokia, $130 million
PixStream	VenGrowth	2000, acquired by Cisco, $369 million
FastLane Technologies		2000, acquired by Quest Software, $100 million
West End Systems	Capital Alliance, VenGrowth, others – $20M	bankrupt
Castleton		10%
Televitesse		10%

Source: Presentation by Claude Haw, Venture Coaches, presentation at Carleton University, November 18, 2003.

* Source: Bagnall, J. (1998). Venture financing soars: Up 131 per cent, but new deals are becoming increasingly scarce. *The Ottawa Citizen, May 27 [Final Edition]*, p. G.8.

a: VenGrowth owned 17.8% of the common shares of Tundra Semiconductor prior to public offer, Tundra, IPO Prospectus, SEDAR.com.

Table 5: VC Involvement in Local Companies that Went Public in 1993

Affiliate	VC Involvement
AIT	none
Canadian Bank Note	none – CBN had been in business for a long time at the time of their IPO.
Jetform	none– Jetform was employee owned at IPO.
Calian	none – A service company with many government contracts, it bootstrapped with $100K in angel financing.
Mosaid	very little – BG Acorn owned 10% of Mosiad at IPO (Standard Microsystems Corp. had made a strategic investment and also owned 10% at IPO.)
DY 4	Noranda Resources and the CBC Pension Fund owned about 50% of DY 4 when it went public.
Microstar	none
Seprotech	none
Plaintree	yes – corporate VC funding Had early investment BCE Ventures Corp.[a] Also capital from Gandalf and later from Delaney & Walters of Sherritt.
Fulcrum	none - The sole owner at IPO was Datamat Ingregneria dei Sistemi S.p.A., of Rome, Italy.

a BCE Ventures was founded in 1988 with $84M pool created by fusing the venture capital operations of BCE Inc. and Northern Telecom Ltd and with an investment strategy weighted toward communications and information technology.

Table 6: 1996 Investments by VC Firms Active in the Region*

VC Firm	Invested in 1996	Number of Investments	Smallest / Largest Investment
Working Ventures	$21.7M	15	$500K / $5.4M
Capital Alliance Ventures	$16.3M	12	$475K / $2.0M
Celtic House International	$20-25M	8	
Business Development Bank	$7.4M	7	$500K / $1.8M
VenGrowth	$22.3M	4	$2M / $12.5M

Source: Bagnall, J. (1998). Venture financing soars: Up 131 per cent, but new deals are becoming increasingly scarce. *The Ottawa Citizen, May 27 [Final Edition]*, p. G.8.

* These figures are not limited to local investments.

Table 7: VC Investing in the Ottawa Region

	1998	1999	2000	2001	2002
Amount of VC Investment in the Ottawa region*	74.26	274.38	1,261.26	921.80	734.80
Number of VC Deals in the Ottawa region	41	51	75	54	51
Average deal size*	1.8	5.3	16.8	17.1	14.4
Amount of VC Investment in Canada*	NA	2071.05	4931.02	3372.37	2575.66
% of $ for Ottawa	NA	13.2	25.5	27.3	28.5

* $M (Cdn)

Source: Entrepreneurship Centre, OCRI.

Table 8: VC Deals in the Ottawa Region: $30M (Cdn) and Over

Year	Company	Size of deal ($M Cdn)
1998	none	
1999	Eftia OSS Solutions Inc.	45.00
	Catena Networks Inc.	43.95
2000	Bridgewater Systems Corp	30.00
	Sedona Networks	31.90
	SiGe Microsystems	34.00
	webPLAN	50.00
	Cogency	30.00
	Eftia OSS Solutions Inc.	44.70
	Peleton Photonic	31.00
	Ubiquity Software Corp	63.00
	Catena	90.00
	Innovance Networks	115.00
	MetroPhotonics Inc	62.50
	Zucotto Wireless Inc.	53.60
2001	Zucotto Wireless Inc.	52.40
	Watchfire	37.40
	Tropic Networks	92.00
	Eftia OSS Solutions	30.90
	SiberCore Technologies Inc.	30.00
	Quake Technologies Inc.	46.43
	Ceyba	142.00
	Optovation	32.01
2002	Trillium Photonics Inc.	46.30
	Catena	120.23
	Innovance	88.00
	SiGe Microsystems Inc.	65.00

Source: Entrepreneurship Centre, OCRI.

Table 9: Prominent VC Funded Failures Since 2001*

Company	Year failed	VC investments ($ Cdn)	Totals ($ Cdn)
Sedona	2001	$9.5M (1999), $31.9M (2000)	$41.4M
Zenastra	2001	$3M (1999), $58.8 (2000)	$61.8M
Trillium Photonics	2002	$9.6M (2000), $46.3M (2002)	$55.9M
Innovance	2003	$115.0M (2000), $88.0M (2002)	$203.0M
Ceyba	2003	$22.2 (2000), $142.0M (2001)	$164.2M
Zucotto Wireless	2003	$2.5M, $3.5M, $53.6M (2000), $52.4M (2001)	$112.0M
Optovation	2003	$32.0 (2001), $3.0M (2002)	$35.0M
		Total for the seven companies*	**$673.3M**

Source: Entrepreneurship Centre, OCRI.

* These data do not include two other well-known VC funded failures that had a significant presence in Ottawa, Silicon Access Networks and Accelight, because these companies operated in the States as well and were funded there by American VCs. Both went bankrupt in 2003. Silicon Access Networks received $124M (U.S.) in VC funding, and Accelight about $85M (U.S.). These figures are not included in the $3.3B (Cdn) in VC funding raised in the region between 1998 and 2002.

Table 10: Recent Returns* for Labour Sponsored Funds

Active in the Ottawa Region (As of Oct 30, 2003)

Funds	One year return	Two year return	Three year return	Eight year return
Axis Series 1	22.27	-	-	-
Axis Series II	-	-	-	-
Working Ventures Opportunity	-10.56	-12.19	-	-
Capital Alliance Ventures	-4.83	-18.10	-17.27	1.12
VenGrowth I (capped Dec 1999)	-4.55	-9.74	-16.97	3.32
VenGrowth II	-8.02	-6.36	-4.76	-
Average for all such funds	-1.08	-9.21	-11.58	1.03

Source: MoneySense.ca, http://www.moneysense.ca/

* Periods over 1 year are compound annualized returns.