

**Turning up the Heat: How Venture Capital
Can Help Fuel the Economic Transformation of the Great Lakes Region**

Frank E. Samuel Jr.
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EXECUTIVE SUMMARY

Battered for decades by the loss of manufacturing, the outmigration of talented workers, and a sluggish entrepreneurial spirit, the states and metropolitan areas of the Great Lakes region have long struggled to remake the area's once powerful economy. Efforts to grow new industries and jobs in the region are today more urgent than ever, as the global financial crisis, bankruptcy of two of Detroit's Big Three, and ripple effects through the supply-base are churning the economic and physical landscape on which many of its communities were built, and once thrived.

Its deep problems notwithstanding, the Great Lakes region has formidable assets that will necessarily provide the foundation for future economic growth, including substantial research and development capacities, a strong existing industrial base, and growing prowess in key economic sectors and technologies. But this isn't enough: The region still lacks the venture capital investments needed to help translate the huge amount of innovation these assets generate into the high value firms, products, and services that, as the Great Recession recedes, will define the next economy.

The dearth of venture capital has not gone unnoticed, and over the years several states in the region have undertaken initiatives designed to encourage innovative start-up companies, entrepreneurship, and venture capital formation. Historically, the goal of such efforts was to spur state economic development and job creation by providing entrepreneurs with incubator facilities, social networking, and other services. But there has since been some movement away from this public service model toward the creation of business-driven organizations that focus on achieving investor returns by facilitating aggressive growth of innovative firms. These publicly and philanthropically-supported "catalytic enterprises" perform valued services for venture investors that need not be paid for by venture fund management fees, helping spur investment in activities that, given current trends in venture capital investing nationwide, might otherwise be overlooked.

Despite these efforts, a number of challenges have continued to hamper the growth of venture capital investing in the Great Lakes region. First, not enough "investable" deals are created from the vast array of new ideas and projects produced by the region's many universities and other institutions. Second, the high costs of early stage venture investing, while an issue in all communities, is exacerbated in the Great Lakes region by an inadequate critical mass of deals, and by the dispersion of its assets across a wide region. Finally, and in large part due to the first two challenges, the Great Lakes region does not have the capacity to provide lead investments throughout the course of young companies' growth, increasing the likelihood that they will move elsewhere to access needed capital.

This paper presents investors, community leaders, and governmental officials with a venture capital strategy aimed at helping the Great Lakes region successfully overcome these challenges. It is based on the premise that Great Lakes region has several of the key prerequisites for successful venture investing—including the capacity to create innovative products and services that can become investable deals, a knowledgeable investor community, and a growing support structure that can help lower investor risks and costs—but that concerted, collaborative actions by a range of stakeholders are needed to create and sustain a virtuous cycle of venture investment, entrepreneurship, and firm growth in the region.

This study offers two recommendations:

- The core recommendation is to create a Great Lakes 21st Century Fund, a \$1 billion to \$2 billion fund of funds that would invest in early stage venture capital funds operating in and focused on the Great Lakes region.¹ Such a fund would have three major objectives:
 - To invest in early-stage venture capital funds with a presence in the region that focus on investing in operating companies in the region.
 - To co-invest in selected operating companies that are in the portfolios of the venture capital funds in which it invests and to co-invest in these companies through successive financing rounds.
 - To co-invest with large national and international venture firms that create offices in the Great Lakes region.
- The key complementary recommendation is that a variety of private and public stakeholders—including federal, state, and local government leaders, research institutions, the philanthropic sector, and catalytic enterprises—work in parallel with the investor community to create a vigorous support system for venture investment. These actors should not only play a direct role in growing and sustaining venture investment, but also in supporting the research and development, talent generation, and entrepreneurial activities needed to create profitable deals.

The two-pronged strategy proposed here is designed to allow public funding to complement private investing in ways that ultimately yield both financial returns for investors—essential if venture investment is to be sustained—as well as long-term economic benefits for the Great Lakes region at large. Will it alone turn the Great Lakes economy around? Not by a long-shot. But it will help leverage the region’s substantial resources and promising opportunities for venture capital investing, and in turn help the region grow, and retain, the new businesses and jobs it needs to ensure a more prosperous and secure future.

I. Introduction

In its 2006 report, “The Vital Center,” The Brookings Institution took up the gauntlet of economic transformation for the Great Lakes region thrown down by decades of manufacturing decline, out-migration of talent, and an apparent aversion to innovation and entrepreneurship.² The report described the shared challenges and assets of the region and proposed several ways that the federal government could become a stronger partner in helping state and metropolitan leaders restructure their economies to meet the new realities of global competition. Among other actions, the report recommended a regional venture capital fund be established to translate the region's impressive innovation and new technology development into new firms and business growth in the region.³

This study on venture capital emerged from that recommendation and from subsequent discussions with venture capital and entrepreneurial leaders, all of whom have stressed the important potential of venture investment to the long-term economic health of the Great Lakes region. This study is designed to take the policy direction of “The Vital Center” to the next stage by proposing a concrete strategy for how venture investors and managers, together with public, university, and philanthropic leaders, can take advantage of the region's assets to increase and sustain the amount of venture capital available to new and growing firms.

The states of the Great Lakes face a number of complex challenges. These include out-migration both of over-all population and, most disturbingly, of young, educated workers; a failure to replace manufacturing job losses with new growth industries; uncompetitive metropolitan communities that are unable to attract the people and businesses they need to thrive; and failure to create a new social compact of employee benefits and job and income security to replace the uncompetitive model created in the region decades earlier. The severity of these challenges has obviously grown more dire in the past two years as the international financial crisis, global recession, and massive restructuring of the auto industry have intensified the economic dislocations in the industrial communities that are the heart of the Great Lakes region.

Venture capital investing, even when most successful, is certainly no panacea for these problems. As argued in “The Vital Center,” improving the region's economic competitiveness requires that regional leaders undertake a comprehensive strategy that includes actions to improve education and workforce quality, upgrade infrastructure, and preserve and protect the natural environment. But creating sustainable venture capital capacity should also be among the top priorities of business and public leaders who want to turn the Great Lakes region's economy around, for several significant reasons:

First, and most importantly, the availability of venture capital is vital to the ability of the Great Lakes region to create jobs and, ultimately, a higher-standard of

living for its residents. In fact, venture-backed businesses are helping to drive new U.S. business growth and employment: Compound growth rates for venture capital-backed companies in the years from 2006 to 2008 were 1.6 percent in employment and 5.3 percent in sales, compared to overall growth rates of 0.2 percent in employment and 3.5 percent in sales for the U.S. private sector. In 2008, venture-backed firms were responsible for 11 percent of the country's private sector employment and 21 percent of its gross national product.⁴

Second, and related to the above, venture and early stage investing are vital to the ability of the Great Lakes to successfully transition to a more knowledge-oriented economy. Venture capital investing is typically focused on the technologies, products, workforces, and companies of the future, providing financing to grow the emerging sectors—from IT to bio-science to cleantech—that can complement existing firms and institutions that are furiously working to adapt to changing global competition. Unfortunately, these investments are lacking in the Great Lakes region, thwarting its ability to translate disruptive technologies and services into new commercial ventures—and in so doing diversify its economy and lay the foundations for future economic growth.

The numbers summarized in this report tell the tale: Thirty-three percent of all U.S. research and development dollars and 35 percent of all NIH research grants go to the region, but on average only about 13.8 percent of all U.S. venture capital is invested there.⁵ Even more discomfiting, the region's large public pension funds actually contribute 40 percent of all venture capital investments by large U.S. public pension funds—most of which is invested on the coasts.⁶

As a result, the Great Lakes region struggles to convert its research prowess into the innovative, high value firms it needs to transition its economy. Business, civic, and political leaders in the Great Lakes have anecdotes about the significant research performed in their regions and the new technologies, products, and services invented there—and the many resulting businesses they've seen then flee to other regions. Others lament about the scientists, engineers, IT professionals, and MBA's that are educated in the region, but who then go on to work in, or launch, firms in New York, the Bay area, Atlanta, or Boston. Increasing the availability of sustainable venture capital is essential to helping the region stem this drain of cutting edge firms and talent.

Finally, venture-backed economic development is vital to the ability of the Great Lakes region to tell a new, future-oriented story about the region and its communities, re-branding them as innovative and creative talent centers, rather than industrial backwaters. In doing so it delivers on the desire of public and private sector leaders to show that they are re-orienting the region's economy away from the past and making it a magnet, not a repellent, for future-oriented investment and top talent.

The Great Lakes region needs vibrant venture capital for all of these reasons. It needs more high value companies to create wealth, employment, and social value. It needs a stronger orientation to the products and services of the future—e.g. clean technologies, biomedical and information technologies—rather than a singular emphasis on resuscitating traditional manufacturing, which is experiencing employment declines around the world.⁷ And it needs a more powerful motivational story, in order to retain and attract high-tech talent.⁸ Translating the huge amount of innovation created in the Great Lakes into growing new enterprises will help change both the reality and the reputation of the region's economy.

Unfortunately, a number of challenges have consistently impeded the growth of venture capital investing in the Great Lakes region. First, not enough “investable” deals are created from the vast array of new ideas and projects that can be found in the region. Given the region's human and intellectual capital, profitable deals can be created there—but it will take more investment professionals actively working these prospects to realize their potential. Second, the high costs of early stage venture investing, while an issue in all communities, is exacerbated in the Great Lakes region by the inadequate critical mass of deals and by the dispersion of its assets across a wide region. Finally, and in large part due to the first two challenges, the Great Lakes region does not have adequate capacity to provide lead investments throughout the course of a young company's growth. Needed lead capital must be found elsewhere, increasing the likelihood that the company will be asked to relocate—thus removing the fruits of success from the region's grasp.

The purpose of this paper is to present investors, community leaders, and governmental officials with a venture capital strategy for the Great Lakes region that can successfully overcome these challenges. It is based on the premise that concerted, collaborative actions by a range of stakeholders will ultimately yield both financial returns for investors—essential if venture investment is to be sustained—as well as long-term economic benefits for the Great Lakes region at large.

The paper will begin by providing a brief review of venture capital in the Great Lakes region, including an introduction to the basics of venture capital investing. It will then summarize the region's challenges, assets, and opportunities for venture capital growth, providing a strong argument for the region's ability to support more venture capital investing that it attracts now. Finally, it will recommend that state and metropolitan leaders, philanthropy, business organizations, and certain key economic development organizations that in this paper are called “catalytic enterprises” work together to establish a regional fund of funds and, at the same time, take several complementary steps that would contribute to the fund's success. These steps should be aimed at strengthening deal flow, moderating the high costs of early stage investing, and forming a

continuum of lead funding for growth companies—and ultimately improving the overall milieu for venture investing in the Great Lakes region.

II. A Brief Review of How Venture Capital Investment Works

While a full discussion of the inner workings of venture capital investment is beyond the scope of this paper, a short explanation of what “makes it tick” provides vital context for understanding the challenges associated with venture investing in the Great Lakes region —as well as what’s needed to overcome them. Without an appreciation of the unforgiving financial reality that drives venture capital firms and the large institutional funds that are their principal investors, efforts to improve the venture capital climate will prove fruitless. (Appendix A, at www.brookings.edu/metro/great_lakes_venture_capital.aspx has a more detailed description of major venture capital terms and processes. And see “Venture Capital 101” in the VC Industry Overview section of the National Association of Venture Capital’s website, www.nvca.org.)

To understand the discussion and recommendations that follow in this study, readers should keep several key points in mind:

Growing sustainable venture capital in a region requires that conditions be right for private investors to make competitive returns. Business, metropolitan, university, philanthropic, and state leaders all have important roles to play in venture capital strategies, but they are supplemental roles. The key players are financial managers and investors, who, whether they are pension funds in state capitals or international asset managers in London, Hong Kong or New York, search with an eagle eye for financial return opportunities. Without those returns, no amount of governmental funding, political exhortation, or civic hymns to the virtues of innovation, entrepreneurship, and risk-taking will make a sustainable difference.

There are two supremely important numbers in venture capital. The first and most prominent is the return on invested capital that venture fund managers (General Partners) earn for their investors, the fund’s Limited Partners. Returns (profits) not only determine how much money the Firm’s General and Limited Partners will make, but also whether the General Partners will be able to raise another fund and how high they can hold their heads in the venture and investor communities.

The second number, also supremely important but poorly appreciated outside the venture capital field, is the fee income that General Partners use to pay for fund operations. Fees are normally around 2 to 2.5 percent annually of the capital invested by the firm’s Limited Partners and are paid out of that capital. Fees determine how many partners and staff the firm can engage to identify opportunities and perform due diligence on potential deals. This in turn determines how many investments the firm can make and manage. Fees also reduce the amount of the capital received from Limited Partners that is left over for the fund to invest, and add pressure on fund managers to achieve returns.

The iron discipline imposed by the venture capital fee structure is an important reality of venture investing.

Venture capital investing is inherently inefficient because each prospective deal must be thoroughly evaluated individually. As one astute venture capitalist observed, "Venture capital is an inefficient business run by people who think it's efficient." This means that there are few economies of scale in the ordinary sense. As a result, each General Partner and other professional staff have a rather small number of investments that they can evaluate and manage at a time. The average is perhaps four to six active investments per partner or about one or one and a half new investments a year. It is usually necessary to review quickly several hundred business plans to determine which few dozen are worthy of the in-depth evaluation ("due diligence") that will yield the one or two new investments per partner per year.

In order to reduce the inherent inefficiency of venture investing, General Partners use very clear restrictions to focus their resources where they believe they can exercise their informed judgment quickly and to participate productively with management after they make investments. These restrictions will normally lead them to specialize in selected business sectors, stage of company development, and geographies. Silicon Valley venture firms, for example, are conventionally assumed to insist that they will be lead investors only in companies that are in close proximity to them. This disposition is clearly driven by financial efficiency for the Valley venture firm, although it is often justified as more promising for the startup company and its senior executives.

Early-stage investing is especially inefficient as it costs more than investing in later stage companies. For General Partners, this is because it takes more time to understand the products and markets of new early stage companies before an investment is made and to manage the investment after it is made. Moreover, early stage companies generally receive only enough investment to achieve incremental development milestones at which time they must raise another round of capital to enable them to reach the next set of milestones. Thus early-stage investing generally requires smaller, more numerous investments than investing at later stages, which means a higher time-cost of investing.

All of these factors mean that conventional venture capital fees are often inadequate to cover the higher costs of early-stage investment. This is true even though there is evidence that returns from early stage venture investing are in general higher than investing at later stages of business development, at least during some periods of recent business cycles.⁹ According to data assembled by one experienced venture capitalist, early stage deals provide a 46 percent premium on valuations at the time of investment and a 25 percent premium on exit, compared to valuations and exits for later stage investments.

The intrinsic costliness of managing many small investments applies to Limited Partners as well. A fund's Limited Partners, the investors in venture capital funds, are high net-worth individuals and large institutional investors like university endowments and pension funds. When making their investments, they are looking for the most cost-efficient way to deploy their assets. This is true across all asset classes, including private equity, of which venture capital is one category. Discharging fiduciary duties properly costs more with many small venture funds than with fewer larger funds.

The inefficiencies related to early stage investing discourage most venture capital investors. This happens in several ways. For example, Limited Partners will often exercise minimum investment guidelines that discourage investing in small venture funds. As noted in the 2009 Investment Report of the Ohio Public Employees Retirement System, the number of General Partners in which the System will invest are limited in order to maximize leverage, access to the General Partners, and market knowledge, as well as to minimize administrative burdens.¹⁰

Both General and Limited Partners are also intent on limiting their exposure to a failed investment; hence they often limit how large a percentage their own investment can be in any single venture capital investment. For Limited Partners, the combination of minimum investment requirements and percentage limitations substantially restricts their capacity to consider small investments, including small venture capital funds.¹¹

Over the past few decades—putting aside the obvious perturbation in asset values over the past year or so—the value of assets managed by large institutional investors grew dramatically, and venture capital firms were able to raise larger and larger funds. Not only were they able to do so, they were in effect forced to do so by rising minimum investment requirements of Limited Partners. The larger these Limited Partner asset pools and venture funds became, the larger the investments the venture managers had to make in order to deploy their capital efficiently and thus earn competitive returns. As a result, venture capital firms that 20 years ago might have invested regularly in selected early stage companies that offered promising returns no longer consider enterprises at this stage because these companies cannot offer adequately-sized returns relative to the larger venture capital pools. Small companies, moreover, can productively absorb only small investments relative to the larger capital pools that venture firms now manage. And even though ultimately profitable, an early stage portfolio takes longer to reach profitable maturity. For all of these reasons, early stage companies are considered financially unrewarding investments and, consequently, unattractive.

All told, venture capital investors' increasing push to overcome the inherent inefficiencies in the system has important implications for the Great Lakes' region, which will be discussed in more detailed below.

III. The Need for More Venture Capital Investing in the Great Lakes Region

Throughout the Great Lakes region, private sector venture capital fund formation and investing have long been evident. Indeed, the region has venture capital firms that are national icons. A leading example is Morgenthaler Ventures, founded in Cleveland in 1968 and now a multi-office firm with \$3 billion under management. Another example is Arch Development Corporation, organized in 1985 to work on technology commercialization with the University of Chicago and the Argonne National Laboratory. Its affiliate, ARCH Venture Partners, raised its first fund in 1987 and now focuses on seed and early-stage investing. It has raised seven funds totaling \$1.5 billion.¹²

Moreover, despite remarkable amounts of venture investing elsewhere, overall venture investments in the Great Lakes region have been substantial over the past few years. Data for 2004 through the first half of 2009 (Table 1) shows a total of almost \$20 billion invested in the region if all of New York state and Pennsylvania investments are included and almost \$8 billion if all of these states' investments are excluded.¹³ These are substantial investments, by either measure.

Table 1. Venture Capital Investments in the Great Lakes Region, 2004 to 2009 [through 2nd Quarter]

	2004	2005	2006	2007	2008	2009
	Total Raised (MM)					
Pennsylvania	\$723.11	\$423.36	\$1,486.52	\$980.93	\$584.48	\$216.21
West Virginia	\$3.10	\$1.00	\$0.0	\$5.70	\$0.0	\$0.0
Illinois	\$268.78	\$300.45	\$358.85	\$487.59	\$439.30	\$91.30
Indiana	\$64.50	\$53.54	\$81.31	\$84.72	\$182.20	\$47.83
Iowa	\$5.00	\$3.00	\$16.60	\$3.00	\$37.77	\$3.00
Michigan	\$94.15	\$43.20	\$167.60	\$92.05	\$168.50	\$56.07
Minnesota	\$391.32	\$221.39	\$551.53	\$469.42	\$277.70	\$127.48
Missouri	\$92.70	\$51.30	\$121.80	\$100.60	\$53.35	\$21.74
Ohio	\$213.86	\$94.45	\$223.48	\$344.81	\$254.89	\$24.01
Wisconsin	\$56.70	\$54.94	\$74.53	\$79.00	\$55.30	\$3.50
New York	\$942.69	\$1,563.98	\$1,702.03	\$1,372.31	\$1,759.05	\$500.93
Kentucky	\$40.10	\$186.10	\$8.38	\$86.61	\$19.70	\$44.00
TOTAL						
Great Lakes Region	2896.01	2996.71	4792.63	4106.74	3832.24	1136.07
California	\$10,217.47	\$10,741.77	\$13,018.68	\$14,015.70	\$14,503.16	\$4,083.80
Massachusetts	\$2,793.56	\$2,772.20	\$2,915.67	\$3,556.87	\$2,905.45	\$1,044.96
TOTAL						
United States	\$22,272.83	\$23,664.04	\$28,353.22	\$29,922.29	\$28,786.49	\$8,776.03

Source: Dow Jones/VentureSource, compiled by JumpStart, Inc. Because of data limitations, the figures for Pennsylvania and New York include all investments in the state, not just those in western New York and western Pennsylvania, which are within the Great Lakes region as defined by Brookings. These data show that the Great Lakes earned annual percentages of national investments ranging from 12.7 percent to 16.9 percent, with an annual average of 13.75 percent. If the states of New York and Pennsylvania were omitted in their entirety, the remaining states in the region would have received 5.5 percent of national venture investment.

But the substantial investments in Great Lakes venture-backed companies have been no cause for celebration: The region's share in national venture investments should still be seen as much too small.

The most obvious measure of this may appear to be the fact that states in the Great Lakes receive far less venture capital investment when compared to the traditionally active venture investing areas on the coasts, particularly California—

which annually captures nearly half of all venture investments made nationally—and Massachusetts (Table 1).

But how the Great Lakes states match up against to other areas of the country isn't actually relevant in and of itself, however. The far more salient issue is that the amount of venture capital invested in the region is too small relative to both estimates of the amount needed by startups already established there, and, more importantly, to that needed to exploit the unrealized opportunities to create new deals that will achieve good financial returns. As a large majority of the Great Lakes investors consulted for this study in one way or another expressed, deal flow in the region is “Good, but not good enough. Growing, but not fast enough.”

So what is “enough”? With a growing focus on venture capital formation and investment in many Great Lakes states, more voices have advocated for increasing the supply of venture capital, especially for seed and other early stage investing.¹⁴ But there is no reliable estimate for the Great Lakes region on what that supply should be, though some limited efforts have been made to identify an amount. A study for the Ohio Capital Fund, for example, indicates a demand of \$1.3 billion for seed and early stage capital from 2008 through 2016 for new Ohio companies to be formed.¹⁵ Assuming comparable numbers for the other eleven Great Lakes states would lead to an estimate of seed and early stage capital demands totaling from \$6 to \$10 billion over the next several years—a crude guess, but one that indicates the scope of the need and the challenge.

Whatever demand estimates may responsibly be made, they rest fundamentally on assumptions about the number and quality of the seed and early stage deals that have already been made and the number and quality that are likely in the next few years.

But more important than perceived need for companies already or likely to be formed are the regional opportunities for venture returns—discussed in detail in section V—that have not yet been tapped. Making the most of this potential—through concerted action and hard work—is the overriding objective for a Great Lakes venture capital strategy.

IV. Challenges to Venture Investing in the Great Lakes Region

If the amount of venture capital being invested in the Great Lakes region is too small, what, then, is preventing more of it? Is the lack of venture capital simply, as some economists might argue, a rational response of the market? The answer would be “yes” if markets are assumed to be perfectly informed and if imperfectly functioning markets would always self-correct in reasonable time frames.

From a real world perspective, however, the answer is “no,” because of the ways in which factors specific to the region interact with general trends in venture investing—especially the push toward great efficiency described above—to discourage adequate awareness and encourage rigidities in investing patterns. These interacting factors have created a vicious cycle of under investment whereby potentially profitable opportunities are overlooked by venture capitalists, to the disadvantage of the region as a whole.

What factors, then, create the region’s specific challenges?

1. Inadequate local deal flow. No single area within the region, with the exception of Minneapolis (in health care and medical devices), and possible exception of Pittsburgh¹⁶ (in selected information technologies), enjoys its own sustained critical mass of startup companies—that is, a consistent, growing local flow of ideas and projects that turn into deals that merit venture investment.¹⁷ As argued in the next section of this paper, the assets and opportunities to create profitable deals are there—but it takes more work to uncover them than most investors have yet been willing or able to undertake.

2. Higher costs for early stage investors. Even if deal flow were stronger, it is likely to be predominantly early stage for some time. Given the investment trends described above, this is a major disadvantage for the Great Lakes region. As venture capital firms and the Limited Partner investors have moved toward larger investments and away from less efficient early stage investing, a positive feedback cycle has been created whereby venture capital has become increasingly concentrated in larger venture capital centers, such as California, while regions like the Great Lakes have become less attractive. In part, this is because there have been fewer early large success stories in the region that have attracted capital and entrepreneurial attention of the kind that occurred in other regions.¹⁸ This has meant fewer successful investments with returns that generate new capital for more deals that would have led to more success, more new capital, and so on in a virtuous circle. The absence of this kind of productive cycle in the region, contrasted with the growth of venture investing in other regions, has accentuated the inefficiencies of venture investing in the Great Lakes region. Without more efforts to lower risks and costs for investors—the goal of the strategy proposed here—Great Lakes early stage investing is likely to remain unattractive, despite the potential of better than average returns.

3. Discontinuous lead funding. Even assuming that improved returns from more deals can be achieved for early stage investors, a final challenge remains: Venture investment funds in the Great Lakes states are presently not large enough to lead the later stage financing rounds that will carry successful companies through all stages of company growth. This means that companies must go outside the region to find lead investors, thus increasing the risk of physical relocation. There are numerous examples of Great Lakes companies moving to the coasts because new investors made the move a condition of their investing. As success breeds more success and if larger venture funds can be created or attracted to the region, this issue should eventually subside.

4. Geography. It might further be said that the twelve-state Great Lakes region faces a fourth, immutable challenge: It is simply too dispersed for its own venture investing good. There is no way, one could point out, that assets distributed from Minneapolis to Pittsburgh and from St. Louis to Rochester have equivalent critical mass to those concentrated in Silicon Valley or within Route 128 around Boston. In this way, the expansive Great Lakes geography has also worked against efficiency, especially with respect to early-stage investing, where proximity is one way to offset some of the added expense of evaluating small deals. It is no accident that the most thriving venture capital geographies are those where travel times are comparatively short, as in Silicon Valley and around Boston. Consequently, it is plausible to argue that there is no pragmatic regional way to increase the productivity of the several Great Lakes metropolitan centers. Perhaps. This report stakes out a different response: Properly focused work across the region will mitigate the effects of geography and make the most of the region's rich, yet dispersed, resources.¹⁹

Faced with the challenges in the region compounded by the inherent inefficiencies of early stage venture investing, it is no wonder that individual venture firms have gone wherever it was most efficient to maximize their returns. Indeed, the geographic history of Morgenthaler and ARCH Venture Partners is illustrative of the problem. Morgenthaler is now headquartered in Menlo Park, California, with little venture capital activity in Cleveland. And ARCH is a multi-state firm no longer focused exclusively on its original Chicago home region. For all the reasons cited above, these firms found better opportunities to achieve adequate returns for their investors elsewhere than where they started.

Of course, there are also other challenges that may have played into their decision, including Midwest risk-aversion; inadequate and inadequately utilized talent; too few entrepreneurial managers; a lack of galvanizing success stories; and possibly others.²⁰ Some observers believe that one or more of these factors need to be fixed before sustainable venture capital can be achieved in the region. But it is hard to see how to devise a pragmatic action agenda to fix any of these factors individually or together in a reasonable time frame. For example, what practical steps will correct Midwest risk-aversion? What actions can secure

adequate talent utilization or attraction? Which approach will cause a blockbuster success?

These questions are worth exploring, and metro and state leaders should develop answers that address their local situations. But these answers, however helpful as a context for local venture efforts, will not yield a plausible action agenda that is independent of creating better deal flow, lowering costs, and creating a lead investor continuum. Context, in other words, is not enough.²¹ These fundamental objectives must be accomplished if the Great Lakes region is to enjoy sustainable venture capital and the growth in firms and talent it will help fuel—all of which can be achieved, as described in this report, through a realistic action agenda.

IV. Assets and Opportunities: Foundation Stones for a Different Future

The challenges to venture investing in the Great Lakes—underleveraged deal flow potential, inefficiencies leading to higher costs, and a lack of sufficient investment capacity to lead deals through successive stages of business development—are by now widely known. Less commonly appreciated, though, are the formidable regional assets that can energize increased venture investing, assets of the kind that have done just this in other regions. In fact, the Great Lakes region has several of the key prerequisites for successful venture investing, including the capacity to create innovative products and services that can become investable deals, a knowledgeable investor community with substantial capacities to make venture investments in firms that produce them, and a support structure that can help lower investor risks and costs.

The mere existence of the region’s assets does not guarantee that investor profit will be created, however. In this sense, the opportunities in the Great Lakes region are like those suggested by the geologic maps used in oil exploration: no guarantees for any specific location, but ample indications of conditions that have elsewhere yielded profitable opportunities in the past. This analogy supports the necessity of hard work and perseverance to find these opportunities: Just as it takes a lot of effort and many dry holes before oil profits are created—Norway’s Stavanger oil field, for example, was discovered only after years of unrewarding effort—Great Lakes regional assets can reasonably be expected to yield solid investor returns only if they are intensively, intelligently, and persistently explored.²² To extend this analogy further, it is also probable that one “gusher” (e.g. one Google) in the region would validate much exploration that wouldn’t have been justifiable before in terms of ordinary, “rational” venture capital dynamics.

Analogies aside, below is a brief summary of the Great Lakes’ assets, followed by, in subsequent sections, recommendations for marshaling them to more potent effect for both venture investors and for the region as a whole.

A. Numerous Assets that Enhance the Potential to Create Innovations

The Great Lakes environment for creating innovative products and services has several elements: significant R & D funding, the talent pool that both justifies that funding and puts it to work, and opportunities for exploiting the region’s comparative research and industrial advantages. As described here, all of these elements are vigorously represented in the region. Each offers a vital element in a successful venture strategy, if combined in a coherent complementary structure that overcomes the challenges observed in the region.

Research and development. The Great Lakes region is an R & D powerhouse, winning a third of total, highly competitive U.S. public and private research and development funding.²³ Moreover, some of its research institutions have geared

up to use their R & D for commercial purposes. In 2006, for example, the region's leading research universities and hospitals staffed their technology transfer offices at about the same level as those outside the region, earned as much licensing revenue, and created as many start-ups per R & D dollar.²⁴ The Great Lakes region, in other words, has institutions that hold their own in performing competitive R & D and committing resources to technology commercialization.

Moreover, a few leading Great Lakes institutions rank among the nation's most productive in commercializing their research results.²⁵ Among large research institutions in the region, Carnegie Mellon and Purdue set the pace by performing far better than Great Lakes and national averages in both licensing and creating start-ups. In addition, other large research institutions do comparatively well in creating licenses from their research, including the University of Iowa, University of Wisconsin, University of Michigan, Michigan State, and Case Western Reserve. And still others do better than Great Lakes and national averages in creating start-up companies, e.g. University of Rochester, University of Kentucky, Northwestern, and Case Western Reserve. Small research budgets are no bar to productivity on either measure. Duquesne, Kent State, and the University of Akron all produce license and startup numbers at rates that far exceed national and Great Lakes averages.

Although Great Lakes' R & D may be competitive and some of its institutions may perform well on relevant technology transfer measures, Great Lakes R & D may not be exploited in the region by venture investors as fully as it would be if it were produced in California or Massachusetts.²⁶ In one analysis, done with 2002 data, major Great Lakes states received 9 cents or less in venture capital funding for every dollar of National Institutes of Health (NIH) research funding, while California received 30 cents in venture investment and Massachusetts 25 cents for every dollar of NIH funding.²⁷ Because NIH grants are highly competitive, there is no obvious reason to suppose that NIH-funded biomedical research in the Great Lakes states is intrinsically any less likely to yield commercially productive results than research performed on the coasts.

More recent data indicate that disparities exist between venture capital investment in the region and several categories that represent the quality of the region's intellectual capital.

Research & Development funding. Data compiled by the National Science Foundation (NSF) shows that 2006 research expenditures in the Great Lakes states represent 33 percent of total national research expenditures and that the average yearly percentage from 2002 to 2006 was also 33 percent.

For research grants from NIH alone, the data shows a Great Lakes share averaging 32.7 percent over the six years from 2001 to 2006 and almost 35 percent in 2006.

Patents. Data from the U.S. Patent and Trademark Office demonstrate that, as with R & D, a substantial percentage of U.S. patents are awarded to the Great Lakes states, an annual average of 31.4 percent over the period from 2001 to 2007.

Small Business Innovation and Research (SBIR) grants. The performance of the Great Lakes region in winning Small Business Innovation Research (SBIR) grants tells a contrasting story. This federal program makes a percentage of federal agency research budgets available for competitive grants to small companies that work with research institutions to develop technology for commercialization.

The Great Lakes states attract a substantial share of these grants—although there is a good deal of room for improvement. During the period from 2001 to 2006, Great Lakes organizations received averaged 15.7 percent of all SBIR awards annually. This percentage is well below the region's share of other indicia of intellectual capital, as well as its share of national population and gross national product.

By most of these measures, the Great Lakes region has demonstrated that it can create intellectual capital at a rate far greater than its share of venture capital funding. Conventional explanations for the relative lack of venture funding cite a culture that discourages entrepreneurship and disdains failure and point to a lack of serial entrepreneurs—a key talent driver of successful start-up companies. There may well be some truth in all of these views. But another explanation for the disparity is that the region's potential is under-valued by investors, perhaps because it takes more work to uncover good deals. As noted earlier, the drive to make venture investing as efficient as possible encourages investors to concentrate on the geographic areas where deals are known to exist. As one astute and very successful venture capitalist said sardonically in discussing this point with the author, "We're lazy bastards!" In other words, there may be significant potential for Great Lakes company growth and investor returns that is currently unrecognized by conventional wisdom and therefore untapped.

Talent. With a deep historical commitment to public education, Great Lakes colleges and universities are among the nation's—and the world's—most distinguished. Much has been made of the brain drain from many parts of the region. Yet the fact remains that the universities and colleges of the twelve states are among the most competitive, attractive, and productive educational institutions anywhere. Indeed, as noted in "The Vital Center," 19 of the top 100 U.S. research universities are located in Great Lakes states, the most of any region.²⁸

These and other universities and colleges in the region consistently produce substantial numbers of science and engineering graduates, as compared to the region's share of population. The table below shows that in the years 2001 through 2006 the percentage of science graduates fluctuates around the 36 percent mark and the percentage of engineering graduates varies from 32.5 percent and 34 percent in the same period. The Great Lakes states share of total U.S. population is 33 percent (Table 2).

Table 2. Science and Engineering Graduates in the Great Lakes Region as a Percentage of U.S. Totals, 2001 to 2006.

	2001	2002	2003	2004	2005	2006
Science	36.0	36.2	35.9	35.7	36.1	36.2
Engineering	34.0	33.0	32.2	32.5	32.7	33.0

Source: National Science Foundation, www.nsf.gov/statistics/gradpostdoc/

Established Industrial Base. The Great Lakes region enjoys formidable business assets, in addition to substantial resources directly supporting venture capital. With its own large population and easy reach of other major population centers, the Great Lakes region makes up one of the world's major marketplaces. Economic activity, led by many global economic titans, generates a substantial 32 percent of U.S. Gross National Product (GNP). Companies like Dow and Dow Chemical, Procter & Gamble, Boeing, Lilly, foreign and domestic vehicle manufacturers, Alcoa, Eaton, General Mills, Limited Brands, Cardinal Health, Wellpoint, Humana, Timken and 3M, Xerox, Kodak and Corning create new products, employ and train skilled workers, and create and serve competitive markets, many of them worldwide.²⁹ Most of them began as signal entrepreneurial success stories and thus serve as potent reminders of what entrepreneurship has accomplished in the region.

In addition to their own economic value, these companies and their regional supply chains have created a skilled cadre of business managers and associated service firms (e.g. accounting, legal, financial) that provide a potentially powerful talent base for venture capital-backed start-up companies, if re-purposed. And importantly for financial investors, the industrial base provides in some sectors a significant number of acquiring companies for high growth start-up companies.

Potential Opportunities in Key Sectors and Technologies. The Great Lakes region owns promising opportunities for expanding or creating a self-sustaining critical mass of technologies, executive and workforce talent, and investment that venture capital can help to focus in new enterprises. These opportunities can chiefly be found in medicine and health services; green/clean energy technologies, chiefly relating to storage and efficiency; agriculturally-based health and energy products; and new materials.³⁰

Medical and health technologies and services. The region's formidable medical device strengths range from Minneapolis to Chicago to Kalamazoo to Warsaw to Cleveland to Rochester and play to the region's installed industrial base and institutional R & D. Medtronic, GE HealthCare, Baxter, Biomet, Stryker, Philips Medical, Lilly and Abbott are just a few of the region's leading biomedical products innovators. The region's insurance and banking sectors in combination with its outstanding health service facilities can be a major source of application innovation for the huge and growing health services industry, anchored by enterprises like Wellpoint in Indianapolis, MemberHealth in Akron, United HealthCare in Minneapolis, McKesson and Express Scripts in St. Louis and Humana in Louisville.³¹

Green/clean technologies. A focus on a particular type or types of alternative energy generation (e.g. wind) is unlikely to yield a healthy advantage for the Great Lakes region. In contrast, the region is strong in materials technology and components of storage systems for intermittent alternative energy generation and in fuel efficiency technologies in the vehicle and aircraft industries. The freshwater cluster of research and business in Milwaukee exemplifies a new way of associating local competencies and focusing them on new opportunities.

Agriculture-based products. In spite of the splurge on ethanol facilities, using agriculture to generate fuel may be a waste of value creation potential. The value-added potential of agricultural fuel-related products may rather be in lubricants, polymer feedstocks, and fuel additives, rather than in new fuel crops themselves. Products with enhanced nutritional or other health value may also create attractive opportunities. The region has extraordinary agriculture R & D in its land grant universities, as well as in such industry powerhouses as Monsanto, Cargill, and ADM.

New materials. A fourth area in which the Great Lakes region can attain an advantage is in new materials, a strength of its research institutions and industrial base. The advent of nanomaterials presages significant new product innovations. It is not clear that the inventors of new nanotechnology applications will be able to capture the value of their innovations by creating a substantial number of new firms with high, profitable growth potential that will be attractive to venture capital investors or whether the economic values of new materials will be captured by firms that appear to be in other sectors, such as biomedical products or energy.

Because of the employment and technology prominence of the auto industry throughout most of the Great Lakes region, it is worth noting that each of these technology areas have critical capacities to contribute to transforming it, as well as providing valuable opportunities for auto workers and management talent that will not find opportunities in a down-sized industry.

This list of opportunities is suggestive, not definitive. Each area within the Great Lakes region should undertake the task of defining its most promising opportunities and link those findings to venture investing activities in the area. In defining its competitive position, careful attention should be given to three critically important factors: the changes wrought by evolving global competition, the ability to encourage and support disruptive technologies, and the capacities of research institutions to support cross-disciplinary technology innovation. Ignoring these will diminish the region's potential to realize competitive advantage from its existing asset base and additional venture investments.³²

B. Existing Private and Public Investors that Have the Capacity to Find and Support Investable Deals

The innovation capacities just described appear to provide venture capitalists with opportunities to create profitable enterprises in the Great Lakes region. The following paragraphs describe the regionally-based investors that could take advantage of such opportunities, including robust angel and venture investor communities, as well as institutional investors such as public pension funds that have substantial capacities for venture capital allocations. Indeed, a disproportionate share of national venture capital appears to come from the Great Lakes.

Venture investors. Venture investors, whether organized as venture capital partnerships with General and Limited Partners or operating as individual angel investors, make substantial investments in the U.S. economy. In 2008, venture capital firms—reporting through the National Venture Capital Association/PricewaterhouseCoopers Venture Impact report—invested nearly \$28.1 billion nationally, while angel investors are believed to have invested around \$19 billion in the same year.³³ Even though lower than prior years, these dollar numbers are still impressive. But it is not only the money that counts. Just as important is the disciplined entrepreneurial experience that these investors bring to bear on finding, evaluating, and making deals. Indeed, without this investor talent, the money would be wasted. Any effective strategy for sustainable Great Lakes venture capital must consider how to increase the entrepreneurial investor talent pool, just as it considers the far better recognized need for improving the region's supply of entrepreneurial managers.

Angel networks. Because angel investor networks are a relatively new phenomenon, they are worth a special note. Angel investors—i.e. high net-worth individuals who invest their own funds—have long been solo operators, trusting their own experience and instincts to choose profitable investments. In the past few years, many of them have begun to associate with other individual investors to share information about deals and sometimes to invest together.³⁴ As venture capital firms have been driven “upstream”—that is, away from early stage deals and toward companies that have management teams and sales revenue—angel

investors and angel networks have to some extent filled the early-stage investing gap.

Nationally, angel investing has been growing gradually during this decade and by 2007 totaled \$26 billion, a 1.8 percent increase over 2006, but in 2008 declined 26 percent to \$19.2 billion. Angel investments in 2007 were made in 57,120 enterprises, a 12 percent increase compared to the previous year. In 2008, that number declined to 55,480. The Center for Venture Research reports that there were 260,500 active angel investors in 2007. The Center believes that angel investors are the “largest source of seed and start-up capital,” with 45 percent of angel investing taking place at those stages. The Center reported that the 2008 annual returns for angel investments through mergers, acquisitions and Initial Public Offerings were 22 percent, although returns were “quite variable” and bankruptcies accounted for 26 percent of exits.³⁵ The Great Lakes region enjoys many active angel networks, but there is not yet a comprehensive data base for their investing activity, and given the secretiveness of many angel investors, there may never be. Nonetheless, their activities are an essential component of venture investing in the region and should be considered in formulating a venture strategy.

Table 3. Angel Capital Networks in the Great Lakes Region³⁶

	IL	IN	IA	KY	MI	MN	MO	NY	OH	PA	WV	WI
Angel Networks	3	3	1	1	3	9	4	3	7	2	1	4

Source: Angel Capital Association membership data, 2008, available at http://www.angelcapitalassociation.org/dir_directory/directory.aspx The figures for New York and Pennsylvania are only for networks in western Pennsylvania and upstate New York.

Institutional investors. Great Lakes states public and private pension funds, university and foundation endowments, and other institutional funds manage substantial capital. Taken together, the largest public and private pension funds in the Great Lakes states manage a total of \$1.4 trillion in assets. This is 29 percent of the national total of \$4.8 trillion in the largest pension funds.³⁷ Some Great Lakes pension funds have made substantial venture capital commitments. Indeed, Great Lakes allocations total 40 percent of national pension fund venture capital allocations—\$10.7 billion out of \$26.9 billion nationally.³⁸

There is great disparity between regional public and private pension funds in their allocations to venture capital, however. The largest public pension funds in the region allocate on average 1 percent of their assets to venture capital investments nationwide, though the amount differs considerably across individual funds, from zero in many cases to 4.9 percent allocated by the Pennsylvania Employees system, 3.1 percent by the Illinois State University pension fund, and 2.3 percent by the Iowa Public Employees fund.³⁹ In spite of this wide inter-state variation, the cumulative venture capital commitment from the Great Lakes public pension funds is very substantial and runs counter to a notion that the

Great Lakes region is negative about venture capital. Among private pension plans in the Great Lakes states, though, the record of venture capital allocations is modest. This is somewhat ironic in view of the fact that many of the companies associated with these pension funds have their roots in extraordinary entrepreneurial success stories (Table 4).

Table 4. Venture Capital Allocations by Public and Private Pension Funds, as of September 30, 2008

		Total Fund Assets	Venture Capital Allocation	VC Allocation as a Share of Total Assets		
Great Lakes Total		\$1,372,078	\$10,744	0.78%		
Public pension funds		\$908,312	\$9,731	1.07%		
Private pension funds		463,766	1,013	0.20%		
U.S. Total		\$4,760,256	\$26,943	0.57%		
Great Lakes Share of U.S. Total		28.8%	39.9%			
<i>Source: Pensions & Investments Top 200 (figures in millions)</i>						

But while Great Lakes pension funds, especially its public pension funds, contribute a disproportionately large share of national venture capital allocations, the Great Lakes states have not received a commensurate share of the venture capital pools that those pension fund investments have helped to create. As noted above, data from Dow Jones/VentureSource indicates that the Great Lakes region received an average of 13.75 percent of national venture investments from 2004 through the first half of 2009.⁴⁰ According to another data source, during the eleven-year period, 1995 to 2005, the Great Lakes region received an annual average of just over 3 percent of national venture capital investments.⁴¹

Although most of the region's venture capital allocations by public and private pension funds have been invested outside the region, some has been invested in selected venture capital firms that are managed and do invest in the region. Sometimes this has been in direct response to initiatives from elected state officials, as well as to proposals from venture capital fund managers. In other cases, pension fund managers have taken initiatives of their own. Recent examples include the following:

- Indiana Investment Fund is a \$155 million designed by the Indiana Public Employees Retirement Fund to develop a portfolio of venture and growth capital, co-investments, and private equity fund commitments.⁴²
- The New York Co-Investment Program is a \$225 million program developed by the New York State Common Retirement Fund and includes \$200 million raised in 2007 targeted on cleantech co-investments.⁴³

- The Ohio-Midwest Fund is the regional investment program funded by the Ohio Public Employees Retirement System and Credit-Suisse. It is capitalized at \$102 million and selects private equity managers to make investments in Ohio and the Midwest for the purposes of generating superior returns and encouraging Ohio and regional business growth. Created in 2005 and expanded in 2007, the program has selected 15 private equity managers that have invested over \$94 million in Ohio companies.⁴⁴
- And in Pennsylvania, labor and other leaders in Pittsburgh have promoted major new Labor-Sponsored Investment Funds capitalized by “workers’ capital” to invest in regional and small business “to help diversity pension portfolios and generate above-average returns.”⁴⁵

Whatever the size and scope of these and other initiatives, it remains clear that the commitment of the region’s public and private pension funds to venture capital is not matched by venture investments in the region. Pension fund investment managers, like all other investors, seek investment efficiency and competitive returns. This has led them in the direction of making most of their venture capital allocations to venture firms that follow the now-traditional patterns of success.

C. Committed Actors and Institutions that Support VC Growth

Finally, the Great Lakes region has numerous “supporting” actors and institutions that have recognized the need for more venture capital in the region, and have worked to improve the climate for venture investing. These include metro and state governments, community and private foundations, and a variety of intermediary organizations—called in this paper “catalytic enterprises”—that were established to foster innovation and entrepreneurship in the region.

State governments. State governments have in recent years contributed their efforts to increasing venture capital funding through state operating budgets, often as part of a larger agenda of innovation and entrepreneurship. State support has contributed to funding both angel networks and early stage venture capital funds, as well as “validation funds” that research institutions use to develop in-house a product or business based on the institution’s research and technology development. Many states have also enacted tax credits for angel investors. In an assessment published in 2006, the National Association of Seed and Venture Funds described ten factors that characterized successful state efforts. These include private sector management, a long-term focus, profit motivation, and effective scale.⁴⁶

Among the examples:

- Michigan: The Venture Michigan Fund was formed under legislation enacted in 2003 as a fund of funds to invest in venture capital managers investing primarily in Michigan-based early stage companies. Debt financing underwritten by Deutsche Bank and guaranteed by state tax vouchers will provide \$95 million of capital for the Michigan venture community, augmented by an additional \$5 million invested by the Fund's manager, Credit Suisse. Eleven fund managers have been selected so far.
- Pennsylvania: The New Pennsylvania Venture Capital Investment Program has the authority to provide up to \$60 million in loans to venture capital partnerships to invest in Pennsylvania-related companies. Loan recipients are expected to provide \$3 in private equity for every \$1 loaned. Fifty percent of the available funds are to be made available to firms with primary offices in the state's non-metropolitan areas. The Program requires "an adequate rate of return" for its financial support.
- Illinois: The Illinois Innovation Accelerator Fund was launched in February, 2007, with a \$6.4 million close of the \$10 million seed stage fund. The Fund is administered by IllinoisVENTURES, Inc., which also manages a private equity fund, and was created by several Illinois entrepreneurs and by the Illinois Seed/Angel Fund.
- Indiana: The \$75 million Indiana Future Fund was established in 2003 with investments from Indiana public pension funds, corporations and academic institutions. With the addition of the INext Fund, a total of about \$125 million has been raised.
- Iowa: The Iowa Fund of Funds was legislatively established in 2002 as a \$100 million venture capital program financed through bank loans supported by contingent tax credits.
- Ohio: Legislation established the Ohio Capital Fund, a \$150 million fund of funds capitalized by loans backed by contingent state tax credits. In addition, the state's operating budget provides grants through the Ohio Third Frontier program to help capitalize, in conjunction with private investors, validation funds, angel networks and early stage venture capital funds.

State programs are too young to have yielded enough final results (i.e. venture-backed company exits) for adequate evaluation. Some programs that have existed for a number of years report favorable directional results, however. For example, an independent evaluation of the Ohio Third Frontier program reports that, for every \$1 of actual state funding, \$25 was invested by private investors in its capital formation grant recipients and their portfolio companies.⁴⁷ In

Pittsburgh, InnovationWorks, one of the four regional catalytic enterprises supported by Pennsylvania's Ben Franklin program, reports that its investment of \$37 million in 107 technology startups during the period from 1999 to 2006 attracted follow-on investments of \$440 million.⁴⁸

These results are impressive in indicating that follow-on investment from private sector investors is being tracked and used as an important measure of success. Job creation will never wholly disappear from the accountability metrics of publicly-supported programs, but to the extent that professional investor returns are a principal objective, public programs are on the right track.

Ohio's Third Frontier Program

In 2002, the state of Ohio clustered several pre-existing and new programs designed to support innovation-based economic development under the banner of the Ohio Third Frontier program. This initiative built upon earlier state investments in technology-based programs, including the Thomas Edison technology centers and incubators established in the 1980's, the Technology Investment Tax Credit (1996), the Technology Action Fund (1997), and the Biomedical Research and Technology Transfer Trust Fund (2000).

Under the Third Frontier, the Technology Action Fund and the biomedical fund were complemented by additional capital and operating grant programs. All these programs were supervised by a statutorily-created Third Frontier Commission, originally composed of three state officers—the Director of the Ohio Department of Development, the Chancellor of the Ohio Board of Regents, and the Governor's Science and Technology Advisor—and augmented in 2006 by six business representatives. The Commission was assisted in proposal evaluation by expert panels set up and managed by the National Academy of Sciences, whose recommendations have without exception been followed by the Commission, and by other independent evaluation organizations.

In 2009, the Third Frontier initiative was independently reviewed by SRI International and the Georgia Institute of Technology. This evaluation reached the following conclusions.

- Ohio's direct Third Frontier grant investments of \$681 million (2003 to 2008) had attracted \$4.2 billion in additional investment from the private sector, the Federal government and other sources, for a total impact of \$6.6 billion. This represents a return of almost \$10 for every \$1 of state investment.
- Ohio's grant expenditures of \$681 million generated, in addition to the total economic impact of \$6.6 billion, 41,300 jobs and \$2.4 billion in employee wages and benefits.
- Compared to a hypothetical tax rebate of \$681 million, which was estimated to have a total economic impact of \$935 million, the Third Frontier impact was over seven times larger (\$935 million compared to \$6.6 billion).

SRI also noted that this economic impact had occurred even though recipients of Ohio's grants had not yet spent all of their funding and that the reported results had been generated during the "longest U.S. recession in the post-World War II era."

The SRI evaluation also compared Ohio's program to activities in other notable technology-based success stories: Research Triangle Park (North Carolina), Austin, Silicon Valley and the Route 128-Boston metropolitan area. SRI identified four structural characteristics that these regions share and that are also present in Ohio because of the Third Frontier and associated programs.

1. Research-intensive companies and universities, producing world-class research and training a world-class workforce;
2. Visionary regional leaders;
3. Networks that involve business, research and finance; and, most relevant for this study,
4. Strong entrepreneurship infrastructure, including early stage capital and support for technology transfer and early stage companies.

SRI concluded that "Ohio's Third Frontier and related programs represent a comprehensive approach to developing all these attributes in Ohio."

Ohio has directed three programs specifically at early stage capital formation. The earliest of these is the Technology Investment Tax Credit, which allows qualified investors to take a credit against Ohio taxes of up to 25 percent of their investment in defined early stage technology companies. Over the life of this program, from 1996 through 2008, \$28.5 million in tax credits supported \$109.8 million in investments in 422 early stage Ohio companies.

The second early stage capital program made competitively-awarded grant contributions to assist in forming Ohio early stage venture capital funds. By making grants, the state increased the size of the venture funds available for investment without diluting the ownership interests of the general and limited partners of the fund. SRI's report states that from 2001 through 2008, grants totaling \$34.8 million were made to 46 new pre-seed venture funds. By the end of 2008, \$24.2 million of these grants had so far been invested in 206 Ohio companies, along with \$619.1 million from other investors.

The third Ohio program was the Ohio Capital Fund, created in 2003 by state legislation and administered by the Ohio Venture Capital Authority. The fund is made up of loans from financial institutions that are protected by contingent tax credits. A total of \$150 million will be made available. By the end of 2008, \$34.1 million had been drawn down by the venture firms that had received investments from the Authority. These firms had invested a total of \$74.9 million in 30 early stage companies, which had also received \$115 million from other investors.

In summary, the leverage ratios for these three programs so far are as follows:

- | | |
|--|---|
| 1. Technology Investment Tax Credit | \$4 invested for every \$1 tax credit |
| 2. Third Frontier grants to early stage venture funds | \$25 invested in companies for every \$1 drawn down from state grants |
| 3. Ohio Capital Fund investments in early stage venture funds | Over \$5 invested in companies for every \$1 drawn down from Fund investments. |

For more information, see SRI International, "Making an Impact: Assessing the Benefits of Ohio's Investment in Technology-based Economic Development Programs" (2009), available at www.thirdfrontier.com

Philanthropy. Based chiefly on wealth created in the late 19th and early 20th centuries, community and private foundations in the Great Lakes region have assembled substantial endowments that support activities of their choice. In total, the largest private foundations in the Great Lakes states had endowments valued in 2007 at over \$46 billion.⁴⁹ Nationally-known examples from the region abound, e.g. Kresge, Danforth, McKnight, Kauffman, Lilly, Kellogg, Mott, Heinz, and MacArthur, among many others. And in many metropolitan areas, large and not-so-large, community foundations play influential roles. They are located in metro regions as diverse as Chicago and Kalamazoo, Minneapolis and Erie, Cleveland and Des Moines, St. Louis and Akron, to say nothing of Pittsburgh, Southeast Michigan, Louisville, Parkersburg, Milwaukee, Madison, and Indianapolis.

This is a striking regional asset. Yet the resources derived from this capital have historically been devoted to improving education, social services, and cultural institutions, rather than to strengthening economic development. Some foundations struggle philosophically with economic development-related grants, wondering if they relate to their tax-exempt purposes. More and more, however, foundation leaders in the Great Lakes metro areas recognize that economic strength is one of the chief ways to attain the social and cultural vitality that they have long sought. In the past several years, some foundations have experimented with new categories of grants and new collaborations among grant makers, all aimed at economic development. One vehicle for economic development is the program-related investment (PRI). PRI's are not grants, but loans or other investments in either non-profit or for-profit organizations whose

activities are related to the foundation's purposes. These investments are usually structured to be repaid if possible, with repayments providing an "evergreen" fund for making future PRI's.⁵⁰

Foundations are also experimenting with new collaborations to further economic development. In 2005, for example, the Danforth and McDonnell Foundations in St. Louis were leaders in forming the Vectis Life Sciences Fund I, an \$81 million venture capital fund of funds. In May 2008, the Foundations announced plans for the \$175 million Vectis II fund, which would be one of the largest life-science venture funds in the Great Lakes region. Co-investors in Vectis I included the Washington University, the University of Missouri and union pension funds.⁵¹

Another example is provided by The Cleveland Foundation. Based on its own economic development experience going back to the early 1990's, the Foundation in 2003 led in forming the Fund for Our Economic Future to focus on the economic revitalization of northeastern Ohio. The Fund now has over 100 private and corporate foundation members that have committed to a six-year, \$60 million effort to jointly determined objectives. Fund managers believe that this common effort is unique in the nation.⁵²

And in Indiana, the Lilly Endowment and the Fairbanks Foundation have supported a number of initiatives to support entrepreneurship and business start-ups.

In addition to observing a traditional—albeit dwindling—distinction between social and cultural support and economic development, foundations have historically resisted suggestions that they allocate their invested assets in order to advance directly their program goals. Consequently, deaf ears have usually received recommendations that foundations deploy a portion of their endowments to invest in catalytic enterprises or venture capital activities. The St. Louis foundations just mentioned are charting a different course, as is The Cleveland Foundation, which is leading efforts to raise an early stage capital fund from foundation sources to complement other venture capital activities in northeast Ohio.

Catalytic Enterprises. Over the years, as regional venture capital firms moved away from local early stage investing in the Great Lakes, many states' economic leaders tried to increase the attraction of the region for venture investors by encouraging innovation and entrepreneurial activity. The chief mechanisms they set up were organizations providing technology commercialization, networking, and incubation services directed at entrepreneurs, both experienced and would-be. These functions were often housed together in non-profit, public-private partnerships, in which universities, local business leaders and state governments became stakeholders. These helper or "intermediary" organizations were all intended to have a transformative effect on local or state economies, so this study uses the term "catalytic enterprise" to refer to them. There is great variety

among them in structure, purpose, history and relevance to venture capital investing.

There were several problems in this approach as a venture capital strategy. For one thing, most of these organizations were not associated with investing capacities. They could help their “client” businesses by providing advice, connections to experts and talent, and low cost or specialized incubator space, but not by providing capital. Consequently, return-on-investment analyses and the professionals who could make them were not critically important and were not engaged by these organizations.

Second, because of their tax-supported funding and public accountability, these organizations had a strong public service orientation: that is, services were expected to be made available to any bona fide entrepreneur, would-be entrepreneur, faculty member or innovator who wanted them. It is a simplification, but not a misleading one, to say that catalytic enterprise managers were public servants, not business executives. And achieving competitive returns for financial investors was, at most, a rhetorical flourish: Clients, metrics, leadership qualifications, and executive compensation were all designed on a public service model, not tied to business growth or financial results.

These problems have been evident for many years, and many changes in the objectives and incentives for catalytic enterprises were sought by more far-sighted state and university officials, more sophisticated philanthropic grant makers, and more demanding business leaders. In response, strong business orientations are now gradually becoming more common, tougher evaluation of potential deals more accepted, and small validation and pre-seed funds more frequently available to assist at the early stages of concept validation and prototype development.

As a result, catalytic enterprises are beginning to emerge that can provide professionally competent services related to early stage companies that lower investment risk by helping to prepare deals more rigorously. In other words, these enterprises can function as part of early-stage investing overhead that competently assists in “de-risking” projects but does not need to be paid for by the conventional venture capital fund fee structure. To the extent that this pattern strengthens, it can provide some relief for early stage venture capital investors from the rigid resource limitations imposed by venture capital fees described earlier in this paper.

More needs to be done to encourage stakeholders to treat catalytic enterprises as independent business operations, rather than as captive organizations that exist to serve specialized stakeholder interests. Where this transition has substantially taken place, the catalytic enterprise will be able to play an active role in supporting venture capital activities in the Great Lakes region. Where this transition has not occurred, there may be opportunity for the enterprise to be

transformed, as has occurred successfully with ARCH Ventures and BioEnterprise, or for a new, returns-focused enterprise to take the place of existing organizations or to perform distinctive new functions.

Catalytic Enterprises in the Great Lakes Region

Three examples illustrate different aspects of how catalytic enterprises have evolved. The first is of an organization that began as public-private technology commercialization service and evolved into a selective, deal-driven enterprise. The second is a university technology commercialization office that spawned a nationally regarded seed and early stage venture firm. The third is a venture capital fund operating within a cluster of local economic development programs.

The first example is Bio-Enterprise, which has its roots in two non-profit Cleveland organizations founded in the mid-1980's, the Edison BioTechnology Center and the Edison Technology Incubator. Both were components of the Ohio Thomas Edison Technology Program's partnerships between the state, Cleveland area research institutions, and local business leaders. During the 1990's, EBTC became a state-wide advocacy organization (now called BioOhio) for the health care technology community. Its original Cleveland office was combined in 2002 with the Edison Technology Incubator to form BioEnterprise, whose executive leaders now have extensive business experience and work intensively with selected companies that have strong growth prospects.¹ \$880 million has been invested in 90 medical device and health care companies in the northeastern Ohio region since 2002.¹

ARCH Venture Partners' predecessor organization began in 1985 to commercialize technologies originating at the Argonne National Laboratory and the University of Chicago. It worked closely with the two institutions and the business school of the University. Among these students were the founding partners of ARCH Venture Partners, which formed its first venture fund in 1987, capitalized at \$9 million. ARCH Venture Partners has raised a total of seven funds and opened offices in Austin, Seattle, and San Francisco. With its seventh fund, the firm now has approximately \$1.5 billion under management.

In each case, organizations that began as not-for-profit technology commercialization intermediaries between research institutions and the business world evolved along quite different paths into business organizations with private sector leadership, objectives and credibility.

Still another and different model for organizing the catalytic enterprise is demonstrated by the activities associated with Southwest Michigan First, the economic development organization based in Kalamazoo, Michigan. These activities include an angel investor group, First Angels; a business accelerator, the Southwest Michigan Innovation Center; and a collaboration among conventional banks, the Kalamazoo Bank Consortium for Innovation. The chief component of the Kalamazoo catalytic strategy is the Southwest Michigan First Life Science Fund, a \$50 million private, for-profit, fund formed in 2005 with a so-called “dual bottom Line:” to make money for its investors and to favor businesses located in—or committed to—southwest Michigan. A life science focus made sense for this geographic region because of the workforce, managerial expertise and capital created by the presence of such bioscience entrepreneurial success stories as The Upjohn Company, MPI Corporation, the Kellogg Company and Stryker Corporation.

Other examples include Pittsburgh, where life sciences and information technology research and commercialization progress has been fueled by long-standing state support for catalytic enterprises and venture capital attraction, and St. Louis, where a focus on plant sciences and major philanthropic support created commercialization capacity and venture capital creation.

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This quick review of the region’s assets reveals a provocative contrast between, on one hand, the capacity to create innovation and the commitment to venture capital investing and, on the other, the actual deployment of venture investments. Table 5 summarizes this contrast.

Table 5. Great Lakes Region’s Share of Selected National Totals. ⁵⁶

Population	33%
Gross National Product	32%
Research and Development spending	33%
National Institutes of Health research grants	35%
U. S. patents awarded	30%
Science and engineering graduates	36%
Venture capital allocations of public pension funds	40%
Venture capital investment	13.75%

V. Creating Sustainable Venture Capital in the Great Lakes Region

The Great Lakes states have substantial resources and promising opportunities for venture capital investing that could give them a solid advantage in competing for investments. Yet, in spite of much ongoing effort by states and metro areas, their formidable capacities to create technological and talent capital have not been brought effectively to bear on dealing with the region's three principal venture investing challenges: inadequate deal flow, high investing costs, and a lack of a lead investor continuum.

In unlocking the potential of these resources, the following principles should be observed.

First, what is needed is more work, not more thinking and planning, not finding a previously unappreciated "right" answer. More work is needed by investors and entrepreneurs to identify and do deals, the essential work that only venture capitalists and the executives of their portfolio companies can do and that will earn them the returns that they and their investors expect. And more work is needed by universities, states, metro areas, catalytic enterprises and others to do the complementary work that only they can do. Their effort will not only contribute to creating competitive investment returns for venture investors, they will achieve the collateral benefits of job creation, economic development, and more prosperity for their region.

Second, the various stakeholders must work in concert with each other, not in sequence or independently. In a metro area, for example, all organizations with a mission to improve entrepreneurial success should be working toward the common objective of achieving investor returns and sharing—rather than taking—credit for success.

Third, scale matters. Fragmented, separately managed initiatives will not have adequate impact and will consume time and money in raising funding and taking credit. This is important not only for capital fund formation, but also for catalytic enterprises, where the malady of organization alphabeticosis characterizes too many metro areas and states.⁵⁷ It is also critically important to keep adequate scale in mind in assessing opportunities for venture investing. Given the increased size of venture funds, the size of the eventual market opportunity needed to attract venture investors has been scaled up as well.

Fourth, and most important of all, any concerted activity aimed at creating more useful venture capital work in the Great Lakes region must yield competitive returns for financial investors. Without this result, no strategy can succeed, and the economic development objectives of regional stakeholders won't thus be met through their venture capital strategy.

With these principles in mind, stakeholders must focus on addressing the three problems that face venture capital in the Great Lakes in the following ways:

A. Pay for work necessary to improve deal flow. This work comes in two forms:

1. Engage more investment and operating talent

Here venture capital plays two key roles. The more obvious one is paying for work by talented managers and other workers within growing companies. The second role, equally essential but less appreciated, is assembling talented investors and their professional staffs who work hard to find, structure, finance, and manage deals.⁵⁸

2. Find more ideas in research institutions/communities

Research institutions, chiefly universities and hospitals, play key roles in idea generation and talent attraction. “The university as the hub is the most valid concept for building the entrepreneurial economy,” says a leader in Great Lakes-based early stage venture investing.⁵⁹ The key areas for improvement by Great Lakes universities are: invention disclosures, productive licenses, and local start-up companies (based on university research) that receive investment independent of funding from the institution itself and from local catalytic enterprises.⁶⁰

B. Pay for work that lowers costs and thus improves returns for investors.

Work that produces more potential deals is not enough. Without intervention, investor returns from early stage deals in the Great Lakes region will carry the high costs that are intrinsic to early-stage venture investing. The second work focus, therefore, must be on lowering risks and costs and thus improving returns.

1. Lowering risks

In formulating strategy, it is helpful to view venture capitalists as risk managers, rather than risk takers.⁶¹ A successful strategy will be directed toward creating coordinated activities that help venture capitalists reduce and manage their risks throughout the spectrum of venture capital activities: identifying and structuring deals, making and syndicating investments, nurturing businesses, optimizing exits.

As this report noted earlier, the conventional venture fund fee structure does not easily accommodate the excess costs of de-risking early stage investments. A major challenge for a sustainable Great Lakes venture capital strategy is to create, outside of the ordinary venture fund fee structure, qualified, business-oriented capacities that can be credibly brought to bear on identifying, evaluating, structuring, managing and optimizing eventual liquidity from deals.⁶²

2. Lowering costs of doing deals.

The most effective way to improve returns is to invest in more, better deals, i.e. to increase the likelihood that any particular portfolio of investments will be successful. Investors need to identify quickly and reliably which deals will be winners and which losers.⁶³ Successful angel and venture investors use a combination of quantitative skills and seasoned judgment to optimize the quality and speed of their investment decisions. But selecting and structuring deals with the most promising companies are still hard work, and the unavoidable discipline of the venture fund fee structure imposes strict limits on the amount of work that investors can devote to seed and early stage deal-making.

In the Great Lakes region, the still-evolving development of catalytic enterprises—the “Great Lakes Model”—is one way to avoid the strictures of the conventional fee structure. In addition to the cost reductions that can be achieved by using competent catalytic enterprises in the venture capital process as called for by the “Great Lakes Model,” states can help to improve returns by reducing investor costs through support for venture capital fund formation and providing tax incentives for individual investors in early stage companies.

Other tools that states can use to make early stage financing more efficient include (1) creating more effective information flow about projects and deals in the region, and (2) making syndication of meritorious deals more efficient by creating trust-building networks and relationships among angel and other venture investors.⁶⁴ Public and private organizations can collaborate productively in taking such steps, although public organizations need to respect the business objectives and confidentiality requirements of private investors.

The Great Lakes Model

Using catalytic enterprises to improve returns by reducing risks and costs for venture investors is a model of public-private partnership that has emerged sufficiently to be characterized as the Great Lakes model. The model is an ideal that is suggested by the evolution of a few organizations in the region, as explained in the text.

The major features of the Great Lakes model are these:

First, some of the intrinsic added costs of identifying and preparing start up companies for early stage investing are borne by public and philanthropic sources.

Second, these funding sources accomplish this by supporting catalytic enterprises that are driven chiefly by business objectives, not economic development or public service. This means that:

- Projects and deals are rigorously selected and continuously evaluated for technical feasibility, market promise and managerial competence, and that
- Similar criteria apply to projects based in research institutions, where technology transfer and commercialization projects are rigorously evaluated for market prospects and business acceptance in addition to scientific or technological innovation.

Third, executives of these catalytic enterprises are evaluated and compensated by private sector standards.

Fourth, catalytic enterprises and research institutions have at their disposal investment funds suitable to the development stage of the projects they select for attention.

Underlying the Great Lakes model are two principles:

- De-risking projects in order to attract private sector investors; and
- Funding this service through public and philanthropic sources, not the venture capital fee structure.

C. Stay with the deals throughout their development and growth.

Staying with the deal means that the region must have a continuum of lead venture investors that is able to provide capital to all stages of financing needed by the region's startup companies and to participate in whatever exit or liquidity events take place. The stages of business development have been variously described and include the following stages (See Appendix B, available at www.brookings.edu/metro/great_lakes_venture_capital.aspx):

- Idea development and initial business planning
- Company formation, including initial management team
- Company development, including initial manufacturing and marketing, expansion of staff, and first sales and revenues.
- Company growth, and
- Company maturity, venture investor exit or liquidity event.

Capital scarcity at any of the stages of company development can threaten the company's existence and, consequently, the investment returns for prior investors. Importing lead investors from outside the region may be accompanied by the risk that these external investors will condition their funding on a company's move to another location. Although this can happen at any stage of company development, it is especially likely—and troublesome—at intermediate and later stages as a company grows and approaches a liquidity event. In financial terms, this means that the greatest risk of relocation occurs between the first and second rounds of professional venture investment.⁶⁵ After the first round, company growth may demand investments that are too large for most funds in the Great Lakes region. Translated into practical terms, providing a regional continuum of lead venture funding capacities means that work needs to be done to create or attract larger funds to the region, as well as providing more early stage capital.

Having a continuum of regionally available venture capital capable of leading successive investment rounds will achieve three important results: (1) retaining companies, along with the economic development and jobs consequent on their presence and growth; (2) retaining experienced entrepreneurial talent that may originate or be engaged for subsequent regional startups, and (3) retaining investor wealth and reinvesting capacity in the Great Lakes region.

Providing the actual financial capital needed across the continuum of business formation and growth is predominantly the responsibility of private sector capital pools and their managers. Public and philanthropic sources can assist with this work, especially at the earliest stages of business ideation and formation, by funding the catalytic enterprises that exist in most Great Lakes states and evaluating them using business, rather than solely public service, standards. As was discussed more fully above, this assistance essentially finances the added overhead associated with early stage venture investing that cannot realistically be borne by conventional venture capital fees.

The only way to get more work is to pay for it. Because conventional venture capital fees are not adequate to accomplish this, the next section turns to the question of how to pay.

VI. Recommendations

The Great Lakes states have the potential to create more competitive returns for venture investors than is presently being recognized. There is a greater potential both for making more profitable deals from the intellectual capital of the region and for realizing higher returns from early stage Great Lakes deals. The only way to realize this potential is through more work to combat the major challenges discussed above: inadequate deal flow, high early stage investing costs, and a poor lead investor continuum.

To state the obvious, there are two kinds of money available to pay for more work: public money or private money.⁶⁶ If public money alone pays, the demands of public accountability for reaching economic development and job creation objectives are likely to prevent work from reaching essential business and financial objectives. Work paid for only publicly will never be sustained independent of public subsidy. On the other hand, if private money pays, work will be focused by business objectives and metrics. Only a strategy driven by business objectives and metrics will attract private capital. And only private capital on a scale commensurate with the region's potential can support a sustainable strategy. Yet it is hard to attract private capital to the high-risk field of early stage investing in geographic locations where high risk is accompanied by high costs and where, moreover, there is a perceived shortage of experienced entrepreneurial talent.

As a consequence, the Great Lakes region is unlikely to attain sustainable privately-financed venture capital, particularly at the early stages of company development, in the absence of state or philanthropic funding for certain activities that complement core venture investing activities. From a practical point of view, then, both public and private funding will be necessary in the Great Lakes region for the time being. The key issue is how to develop a strategy in which public funding complements private investing in ways that do not crowd out the imperative that private investors receive competitive returns.

Some experienced observers contend that no conscious strategy is needed at all, especially not one spearheaded by government. The private sector, they argue, will make the most of any legitimate profitable opportunities without help from government or the non-profit sector.

Clearly this hasn't yet happened. It appears that the Great Lakes states, therefore, need an affirmative venture capital strategy that treats these twelve states as a reasonable geography for common attention. A regional strategy is appropriate for many of the reasons set forth in "The Vital Center": similarities of business history, educational commitments, social attitudes toward work and entrepreneurship, and economic challenges, and, importantly, a shared set of unique assets and conditions for venture investing. A regional strategy is also called for by a negative reason: with the very few exceptions noted earlier, no

metropolitan area in the Great Lakes region has demonstrated that it has an adequate local base for a sustainable venture capital strategy across its economy.

To this end, Great Lakes region stakeholders should come together around two primary actions: (1) creating a Great Lakes fund of funds and, (2) strengthening the support system for venture capital investing. Together, these two complementary recommendations will help remedy the challenges of venture capital investing in the region.

1. Create The Great Lakes 21st Century Fund Initiative (“the Fund”). Private stakeholders should establish a regional fund of funds initiative that would, either through a single fund of funds or a planned succession of such funds, help investors and entrepreneurs to create and grow profitable companies in the Great Lakes states. Such a Fund (or Funds) would have three major objectives:⁶⁷

- To invest in early-stage venture capital funds with a presence in the region that focus on investing in operating companies in the region.
- To co-invest in selected operating companies that are in the portfolios of the venture capital funds in which it invested and to co-invest in these companies through successive financing rounds.
- To co-invest with large national and international venture firms that create offices in the Great Lakes region.

In working toward these objectives, the Fund should also be positioned to provide expertise to institutional fund investment officers and boards beyond the advice that they contract for from investment advisors and receive from their own staffs. This benefit, while appearing incidental, would be valuable to public pension funds and other institutional investors.

A. Characteristics of the Fund

The Great Lakes 21st Century Fund would have several major characteristics.

First, definitions of “presence” and “focus” would be structured so as to allow flexibility in achieving the objective of sustainable venture capital activity in Great Lakes states. The Fund should have authority to participate in financing both venture firms and operating companies outside of the Great Lakes region where that contributes to creating a sustainable Great Lakes venture capital continuum, e.g. through attracting venture capital capacities to the region. Rigid business sector limitations would also be avoided because of their adverse effect on potential returns and thus on the interests of financial investors and prospective general partners of the Fund.

Second, the Fund would treat the Great Lakes region as possessing as a whole large enough critical mass to support a diversified portfolio of investments in venture capital firms that lowers risk and improves investment returns. By supporting numerous venture capital firms, a fund of funds approach both diversifies its own portfolio and avoids having only one gatekeeper for access to significant new early stage capital for entrepreneurial companies.⁶⁸

Third, the Fund would be large enough to attract seasoned general partners with a track record of successful fund-of-funds management and to qualify for substantial institutional and other traditional limited partner participation. Recommended total Fund size would be in the range of \$1 billion to \$2 billion.⁶⁹

Fourth, the Fund would be organized and managed by a private sector firm chosen by an RFP process that does not depend on government funding or leadership and that has the appropriate track record. Although it could well contribute to regional economic transformation, the Fund would be a private-sector initiative with a conventional strategy of achieving competitive financial returns for its investors.

Fifth, the Fund would target its investing on venture firms that identify areas or sectors where a critical mass of business activity has been or can be created in the Great Lakes states. These clusters are likely to have the critical technologies and workforce that create fertile investment opportunities. Illustrative examples are biomedical devices and data storage technologies in Minneapolis, data security and management in Pittsburgh, biomedical devices in Indiana, biomedical devices and health information management in Cleveland, agriculturally-based products in Iowa and at other land grant universities, and energy storage and efficiency and other clean technologies in Michigan, Wisconsin, Ohio, and a variety of other areas.⁷⁰ To target its investments effectively, the Fund should employ people who are knowledgeable about the specific industries and locations in which applicants for its investments intend to invest.

Sixth, the Fund would overcome the inefficiencies of geography and the higher costs of early stage investing by consciously collaborating with selected catalytic enterprises throughout the region that demonstrate the capacity to improve returns for financial investors by thorough-going use of communications technology; gradual building of trust among investors in the region; and disciplined attention to internal communications.⁷¹

Seventh, the Fund should be encouraged to facilitate information exchange and collaboration among the venture capital firms in its portfolio, as has been done by the Vectis funds in St. Louis and the Ohio Capital Fund.

Finally, the Fund's managers should also be authorized, if in their judgment it would contribute to the success of the Fund, to follow the Illinois example and

manage—in addition to the Fund—a publicly capitalized fund to make technology transfer deals, as well as pre-seed and seed investments.⁷²

(Note that these last two points should be left to the discretion of the Fund’s managers. They should not be limitations on the managers’ authority to achieve the best returns for Fund investors and should not be criteria for evaluating responses to a Request for Proposals.)

B. Advantage and Disadvantages

A fund of funds with these characteristics—complemented by metro, state and other efforts to improve the overall environment for venture investing, as described below—would be the most flexible and efficient way to meet all three of the venture capital challenges facing the region, for several reasons.

First, any initiative that makes more capital available contributes to finding and doing more deals. A fund of funds can do this more efficiently by taking advantage of the existing array of early stage funds already operating in most Great Lakes metro regions, rather than competing with them for deals—as either a single Great Lakes regional venture capital fund or multiple small venture funds would do.

Second, the fund of funds can enhance the value of both the committed capital and the incumbent investor managers of the existing (and newly formed) funds. It will accomplish this not simply by giving them additional investment capacity, but also by co-investing in selected deals and by creating a network of operating venture funds connected by their relationship to the fund of funds. This helps to moderate the high costs of early stage investing.

Lastly, because of its larger size, the fund of funds would be able to provide capital and assist in leading deals through successive rounds of financing for companies that demonstrate strong records of profitable growth.

From the perspective of large public pension funds—one of the national mainstays of venture capital fund investing—a fund of funds can yield important benefits. First, a substantial fund of funds can help public pension funds reach their relatively large target allocations and thereby make a meaningful contribution to their returns. In addition, a fund of funds can help in educating public pension fund trustees about meaningful venture capital allocations. Finally, the fund of funds can contribute to risk mitigation for the investor’s venture capital investments by its diversification and oversight.

A significant fund of funds initiative will, by its very presence, create a new pattern of relationships among venture-related organizations within and without the Great Lakes region. Its sheer size will be a major factor in accomplishing this.

More important will be its capacity to encourage intra-regional sharing of information and to facilitate intra-regional syndication of deals. This capacity will contribute to a new culture of regional investing. By its very size and resulting prominence, the 21st Century Fund can be game-changing for the Great Lakes venture investing environment.

The two principal alternatives—a single large regional fund or a number of smaller, metro area funds—pose serious problems of inefficiency and ineffectiveness. A large single fund will compete with, rather than complement, existing funds. A series of small funds added to the growing number that already exist across the Great Lakes metro areas would similarly add competition, but with the added disadvantage of weaker, thinly capitalized firms. Moreover, a single large firm or a series of small firms has less capacity and motivation to establish a network of mutually supporting firms. And a series of small firms cannot contribute to the venture capital lead investor continuum.

There are some disadvantages to the fund of funds approach, of course. The key apparent financial disadvantage is higher total management fees, though this may be overcome if fund managers with compelling track records can create greater confidence that adequate returns can be achieved. There also is no compelling precedent, with no other fund of funds of this size operating on a regional basis with a successful track record, though this may actually be an attraction for some in the private sector. Finally, there is no other demonstrated productive collaboration of governments, civic and business leaders, and catalytic enterprises across state lines in support of such a private-sector led initiative, though this is not likely to be fatal for an investor-led initiative. Formally organized cross-border collaborations are not essential, if complementary objectives are pursued on both sides.

A specific disadvantage for Governors and other elected state officials may be that a multi-state fund of funds will not be sufficiently focused on a single state to be worthy of political support. The fact of the matter is that no financial investor, including public pension funds, prefers a single-state fund. A Great Lakes fund of funds may provide a viable balance between the wholly open investing horizon preferred by financial investors and the single state focus favored by elected state officials.

If the experience of other fund of funds is any indication, a well-managed, diversified fund of funds in the Great Lakes region should be a profitable investment. As of 2007, data for 166 funds of funds formed from 1986 through 2002 indicate that annual net returns to Limited Partners from funds in the highest quartile ranged from 8.9 percent to 25.8 percent. Annual net returns from even the lowest quartile funds ranged from 0.20 percent to 8.7 percent.⁷³

C. Getting Started

Initial exploratory steps for The Great Lakes 21st Century Fund should probably be taken by public or non-profit leaders across the region. Examples of conveners with sufficient standing to command the requisite attention from the private sector include the Council of Great Lakes Governors, one or more of the Federal Reserve Banks in the region (Minneapolis, Chicago, St. Louis and Cleveland), leading community and private foundations, and senior executive business groups. There are natural leaders in the various states and metro regions that will have the necessary stature and convening energy. Certain Federal Reserve banks, the Chicago bank, for example, have strong interests in private equity and venture capital issues, as do some foundations. The potential conveners who do share such interests will constitute an informal network to facilitate the exploratory steps.

From this exploratory process should emerge a call for a fund manager through a Request for Proposal (RFP) process that would include evaluation of proposals by qualified, independent experts. The RFP process should seek a large U.S. or international venture fund of fund manager or other institutional private equity manager with a successful track record in fund-of-fund investing. The manager selected to be the General Partner of the Fund would then continue the process by preparing an offering memorandum for the Fund. This key step cannot be taken by any other group, although it may be assisted by seed commitments from philanthropic or other sources and by potential Limited Partners that express willingness to consider investment proposals that meet their conditions for investing scope, fund manager experience, and investment returns. With the offering memorandum, the prospective General Partner should approach potential Limited Partner investors, using conventional fund-raising techniques.

Because the capital pools that they manage are key prospective sources of capital for the Fund, institutional investors in the Great Lakes region should then be prepared to respond to the fund manager that proposes to create the Fund. Indeed, institutional investors and their investment advisors should play an influential role in formulating expectations for the Fund and in encouraging proposals from investment managers in whose qualifications they have confidence.

One thing is clear. The largest pension funds in the Great Lakes states have sufficient assets under management to make individually modest allocations to the Fund. For example, if the largest public pension funds in the region were together to subscribe 50 percent of a \$2 billion fund, that \$1 billion commitment would utilize less than 10 percent of their total 2007 venture capital allocations, which were on average about 1 percent of their total assets.⁷⁴ And if additional, smaller Great Lakes pension funds—public and private—were to make venture capital investments in the Fund, the percentage would be even lower.

With investment commitments from Limited Partners, the General Partner can then move through the conventional steps of engaging investment professionals, constituting needed advisory bodies, soliciting proposals from operating venture funds in the Great Lakes region, and proceeding with evaluating proposals and placing investments.

2. Strengthen the Support System for Venture Capital Investing

A financially-driven fund of funds is the key ingredient in a sustainable venture capital strategy for the Great Lakes region. But it is not the only one. Given the geographic dispersion of the region's innovation assets and the relatively early stage of much regional venture investing, a number of non-financial stakeholders need to work in parallel to create a vigorous support system that is clearly focused on achieving financial returns for Great Lakes venture capital investing and thus for the Fund.

Great Lakes stakeholders need to undertake a range of specific tasks to strengthen the venture capital support system, as described below. In addition, they have a variety of more general, but related, roles to play. These include: changing the risk-averse image of many locations by heavily publicizing local entrepreneurial successes; graduating more science and engineering professionals; funding more competitive, commercially-oriented research and development; marketing to and attracting more established and early stage businesses with significant growth prospects; and addressing tax and regulatory burdens where they exist. One way to encourage these activities and to provide mutual reinforcement for their leaders would be through creating a Global Great Lakes Forum that could share information on building venture capital capacities, as well as on other matters affecting Great Lakes metro areas and states.⁷⁵ Such an activity could provide something that is missing now: an informed, regular forum for bringing the leaders of the investment and support communities together regularly to highlight success, dissect failure, and consider best practices. Properly structured—that is, heavy on personal interaction, light on process and written reports—the Global Great Lakes Forum could become an important part of the support system for The Great Lakes 21st Century Fund, as well as heightening awareness of related regional issues, such as R & D, education and training.

Here are the key assignments for government, research universities, catalytic enterprises and philanthropy.

Government. Government leaders at all levels—metro, state, and federal—must play key roles. One of them should be to overcome the fragmented capacities that characterize the U.S. federal system, calling together, for example, all of the stakeholders in a metro area and helping them align their objectives around investor returns and their reporting and evaluation systems in support of that objective.

Metropolitan leaders preside over the geographic resource aggregations that are key to economic health and recovery. It is a truism that most venture investing occurs in metropolitan areas. It is also a truism that most of the relevant funding is beyond metro control, e.g. state support for higher education, federal R & D funding, and private investment capital. Yet metro leaders can and must be active facilitators and advocates for metro-wide initiatives to create integrated support systems from the disparate resources that exist in every metro area. Mayors and city managers, city department heads, and metro legislative bodies should take the lead in associating these resources and in reaching out to nearby metro regions that have relevant resources and similar objectives, even though they lie across state lines. Appropriate metro officials should examine the investment allocations of municipal pension funds and assess whether investing in the Fund meets their investment criteria. The absence of metro leaders from any of these may weaken area-wide efforts undertaken by other key actors, e.g. universities and foundations.

State leaders fund and manage many of the programs that support innovation, company formation and business growth. Among these are state tax codes, economic incentive programs, higher education funding, and—in some states—programs to support directly venture capital formation and entrepreneurship. State leaders, like their metro counterparts, should view these programs organically, that is, as all contributing to common objectives, rather than as separately managed and evaluated programs. State officials should be particularly attentive to supporting metro area capacities and facilitation efforts.

Specifically, with respect to the support system for venture capital investing, state executive and legislative leaders should:

- Review their support programs for entrepreneurship, applied research, and early stage capital formation and, if necessary, take immediate steps to institute long-range programs that meet the requirements set out above. This advice may seem laughable in today's state budget climate, but initial steps, even if small, are both investments and signals for the future that are required now;
- Enact necessary financial support for professionally-managed, profit-motivated, long-range capital formation for early stage businesses.⁷⁶ These programs should be balanced between attracting and retaining experienced venture fund managers and creating "homegrown" venture talent. State financial support, which for constitutional reasons usually comes in the form of non-dilutive grants, will have the effect of decreasing the number of returns-based investors who contribute to a capital pool, thus lowering costs and increasing returns for financial investors;
- Provide support for catalytic enterprises that is based on competitive proposals that are independently evaluated by qualified experts

against criteria that emphasize a) business performance, b) financial returns to investors, and c) experienced business managers and advisors;

- Provide state tax incentives for investors in early stage companies. These incentives increase the amount of capital that can be contributed by individual investors and thus improve their returns from successful investments. Such incentives are not the sole foundation for a sustainable venture capital strategy, but they can play a useful supplemental role if carefully crafted, especially for angel investors; and
- Require that decisions on state grants or other funding—whether for venture capital formation or catalytic enterprises—be made only with experienced, independent business and financial advice that is a matter of public record. State support provided without this sort of advice is unlikely to be respected by financial investors and therefore unlikely to attract private funding.

Federal leadership can play an important complementary role. Given the economic distress and dislocation in the Great Lakes punctuated dramatically by the auto industry collapse, the federal government has renewed interest in understanding and advancing federal policies and programs that can help nurture a critical mass of capital and talent for innovation and new enterprise development in this hard-hit region. In fact, the White House Council on Auto Communities and Workers is looking to animate particulars of what federal interagency policies and programs can do to assist.

Federal leadership can be very helpful in organizing the region's investor, public, philanthropic, and support organization community to animate the recommendations in this report. Example of opportunities for federal leadership include potential federal aid in convening the Great Lakes Global Investor Forum and affinity group discussions that will contribute to building the regional fund of funds initiative and venture support superstructure.

In addition to vigorous leadership in facilitating regional discussions around the topics of innovation, entrepreneurship and venture capital formation, Federal officials should take the following steps:

- Extend the Small Business Innovation and Research program and restore the ability of small businesses that receive over 51 percent of their funding from venture capital to compete for SBIR grants. Current policy—which resulted from an administrative law ruling, not legislation—prevents such small companies from receiving SBIR funding to augment their venture funding⁷⁷; and
- Revive the authority of the Small Business Administration to help in creating new early stage investment capital. Much can be learned

from the experience with the Small Business Investment Corporations in crafting a new program. Any renewed Federal support should require matching investment of private capital and be awarded through a process that requires competitive proposals independently evaluated.

Governmental leaders are not the only ones who have key roles in creating and maintaining a vigorous support system for Great Lakes venture investing. Leadership is also needed from three other important types of organizations: research institutions, catalytic enterprises and foundations.

Research institutions. The great research universities, biomedical institutions, national laboratories, and private sector R & D labs in the Great Lakes states can all play critically important roles in helping to create and sustain regional venture capital capacities. Above all, as educators of much of the human capital required by entrepreneurial companies, universities should encourage their students and faculty to engage in a wide variety of entrepreneurial activity, both within conventional academic programs and through internships and work-study programs.

In addition, universities and research hospitals need to take the following steps, which can be adapted by national and private sector laboratories to suit their somewhat different situations.

- First, they should review investment policies for their endowments with a view to making an appropriate commitment to The Great Lakes 21st Century Fund. Investment managers and advisors for these institutions, as with their pension fund counterparts, will properly be concerned with fundamental investment criteria: safety, returns, manager quality, and diversification, among other factors. Observing sound investment criteria should not prevent—indeed, it should encourage—considering the Fund.
- Second, the institutions should assure that their technology transfer policies and offices are synchronized with best practice throughout the world. This will require committed institutional leadership, adequate numbers of experienced people in the technology commercialization office, carefully benchmarked policies and practices, and adequate education for the entire institutional community. Specifically, research institutions should strive to exceed best regional achievements—when measured by research expenditures—in the following key categories: invention disclosures, productive licenses, and independently financed business start-ups.⁷⁸ In addition, institutions should assemble in-house—or otherwise have access to—validation funds to assist early prototype development and other steps that will reduce risk for the company eventually responsible for product development, manufacturing and marketing.⁷⁹ These funds can be created with

support from public and philanthropic sources, as well as with the institution's own resources.

- Third, Great Lakes institutions should continue to build their research distinction and compete for public and private research funding, continuing to form collaborations across state lines and national boundaries.
- Fourth, universities in particular can play a convening and networking role for community leaders. Here the work of Richard Lester is helpful in pointing out the university's role as "a public space for ongoing conversations."⁸⁰ This goes beyond the traditional university's traditional roles in research, education and technology transfer to stress the importance of nurturing the leadership dialogue across communities on matters of economic vitality, including financial support for new ventures. In this, they have much common cause with the leaders of the metro areas where they are located and have much to gain by partnering with them.
- Fifth, universities can utilize their vast alumni networks to draw into the university commercialization process new talent and new ideas. The graduates of the Great Lakes colleges and universities constitute one of the greatest pools of talent available for Great Lakes venture investing, and it is largely untapped.

This is a challenging agenda for research universities. They have given at least lip service to its main points for years, and many Great Lakes institutions would argue that they are already leaders. Maybe so; arguing will be only time-consuming. The bottom line is: all Great Lakes institutions have to do better. There is still too much room and need for improvement to suggest that they are already pulling their oar adequately.

Catalytic enterprises. The key function of catalytic enterprises that earns them a place in a sustainable venture capital strategy is lowering the costs of early stage investing substantially enough to earn investment advisor credibility from venture capitalists. If catalytic enterprises are not in a position to perform this function, there may be other, more traditional—albeit secondary—contributions they can make to advancing early stage investing in their area, such as providing social and expert networking services for entrepreneurs and investors and incubator facilities for early stage companies. These traditional services can play a useful role in an area's economic development strategy, but they are not likely to lower early stage investing costs enough to earn credibility from venture investors.

To be an element in the support structure for The Great Lakes 21st Century Fund initiative, catalytic enterprises and their stakeholders should:

- Adopt policies and metrics that stress the importance of achieving financial returns for venture investing;
- Engage through direct employment or other arrangements the qualified talent that can assist new and growing companies to reduce investment risk and improve investor returns; and
- Create associated validation or development funds that can help to de-risk projects as they move toward being operating companies.

Philanthropy. Both private and community foundations in the Great Lakes region can play an influential role by helping communities work across organizational and jurisdictional boundaries to create the support structure for sustainable venture investing. Specifically, foundations should:

- Provide long-range funding for catalytic enterprises that justify their value-added role for venture investors;
- Help to fill gaps in the support structure for venture investing, e.g. assisting research universities to take a quantum leap in technology transfer effectiveness or to help create validation funds for universities or catalytic enterprises;
- Exploit their community standing to convene and foster multi-organizational conversation and action within their areas;
- Collaborate with foundations in other areas within the Great Lakes region to encourage complementary action in support of venture investing across state or metro lines;
- Assure that an appropriate proportion of their endowments is allocated to venture capital investing in the Great Lakes region; and
- Support a Global Great Lakes Forum, in conjunction with other relevant stakeholders, to provide an on-going dialogue about innovation, entrepreneurship and venture investing in the region.

* * *

Working together, all of these key organizations—governments, universities, catalytic enterprises, and foundations—can create and maintain an effective support structure for The Great Lakes 21st Century Fund and for sustainable venture capital in the region. None can do it without engaged collaboration from the others. Certainly, none can do it alone. Concerted implementation of the recommendations in this report will assure that there is ample credit for all partners to share.

VI. Conclusion

The fundamental challenge in designing a Great Lakes venture capital strategy is really very simple: find money to pay for work by talented men and women who are drawn from or to the region. The people of the Great Lakes region enjoy work, and its investors have much experience in raising money. The time has come to address these capacities to the job at hand.

The region has substantial untapped potential to create high-growth companies. These resources should be made more productive by tackling the region's three principle challenges: inadequate deal flow, high costs of early stage investing, and the lack of a continuum of lead venture investors needed by growth companies.

Doing the work recommended in this report will address these challenges. In particular, the Great Lakes 21st Century Fund initiative will help to overcome them by creating an efficient mechanism for making more capital available to early stage venture funds in the region and to the successful companies in their portfolios. And the essential complementary work of creating and maintaining a vibrant support structure will require metro and state governments, research universities, catalytic enterprises and foundations to contribute their critically important resources and leadership to this effort.

Taking the steps described above will create a more positive environment for investors to realize competitive returns and contribute to economic change that will profit the Great Lakes states for many years to come.

¹ This report uses the same definition of the Great Lakes region as that used in “The Vital Center”, the Brookings Institution report that presented its Great Lakes Economic Initiative. The region includes Minnesota, Wisconsin, Iowa, Missouri, Illinois, Indiana, Michigan, Kentucky, West Virginia, western Pennsylvania and western New York.

² John C. Austin and Britany Affolter-Caine, “The Vital Center: A Federal-State Compact to Renew the Great Lakes Region” (Washington: The Brookings Institution, 2006).

³ The Brookings definition of the Great Lakes region includes Minnesota, Iowa, Missouri, Wisconsin, Illinois, Kentucky, Indiana, Michigan, Ohio, West Virginia, western New York and western Pennsylvania.

⁴ IHS Global Insight, “Venture Impact: The Economic Importance of Venture Capital-Backed Companies to the U.S. Economy” (Arlington, VA: National Venture Capital Association, 2009). Hereafter cited as Venture Impact.

⁵ Data compiled by Erin Reed Kerrigan, JumpStart (www.jumpstartinc.org), based on data from Dow Jones VentureSource. These data include New York City and Philadelphia, thus overstating venture capital investment in the Great Lakes areas of New York and Pennsylvania and, consequently, venture investing in the Great Lakes region as a whole.

⁶ All pension data from Pensions & Investments, www.pionline.com. See specifically the table “The top 200 pension funds/sponsors” with data as of September 30, 2008, available at www.pionline.com/article/20090126/chart/90120995/-1/PensionFundDirectory, and “Funds among the top 200 with DB [direct benefit] assets in venture capital”, available at www.pionline.com/article/20090126/Chart2/901199959/-1/PensionFundDirectory. These data, while extensive, are not complete; for example, the venture capital allocations of the Minnesota and Ohio public employee system are not included in the second listing for 2008 even though they appear in the reports for 2007. These reports are hereafter referred to as P & I Top 200 and P & I VC, respectively.

⁷ Manufacturing job loss is a worldwide phenomenon. According to The Conference Board (www.conference-board.org), China lost 15 million manufacturing jobs from 1995 to 2002, while the U.S. lost 2 million jobs in the same period. See “China Losing More Manufacturing Jobs than U.S. but Adding Service Jobs at a Rapid Rate”, press release, July 8, 2004.

⁸ For a recent analysis of the Midwest’s plight in the global economy that is informed, trenchant, and caring, see Richard C. Longworth, “Caught in the Middle: America’s Heartland in the Age of Globalism” (New York: Bloomsbury USA, 2008). Longworth’s Midwest is not exactly coterminous with the Great Lakes region as defined by this report and in Brookings’ “The Vital Center,” but the overlap is substantial, and his insights and prescriptions are relevant.

⁹ See, for example, Peter Rip’s analysis, based on Cambridge Associates data, of stage returns for 2000-2008, available at <http://earlystagevc.typepad.com/>

¹⁰ See, for example, the discussion of private equity investment strategies of the Ohio Public Employees System. Typical venture capital commitments ranging from \$40 million to \$80 million and a variety of management factors all discourage investing in early stage funds. Ohio Public Employees Retirement System, “2009 Investment Plan,” pages 50-51, available at www.opers.org/investments

¹¹ See Appendix A, page 6, for an illustration of how this interplay works.

¹² See www.Morgenthaler.com and www.archventure.com.

¹³ Data compiled by JumpStart Inc. based on data from Dow Jones/VentureSource. Other major national venture capital data sources are the PricewaterhouseCoopers/ National Venture Capital Association MoneyTree report, based on data from Thomson Reuters, and the U.S. Venture Capital Index, prepared by Cambridge Associates LLC. See www.nvca.org for reports of both data sets. These data sources are not always consistent, due to differences in reporting criteria. A further challenge arises from the fact that some regional experts believe that data based on standard industry published reports significantly underestimate the amount of venture investing in Great Lakes states and, perhaps, in the nation as a whole. Consequently, some regional organizations have begun to collect data based on their own research as well as on published data. The resulting reports may be more complete, but have originated too recently to be widely accepted. (See for example www.wisconsinotechnologycouncil.com, for a June 18, 2008, press release on venture investing in Wisconsin, and www.bioenterprise.com for reports on biomedical investing activity in northeast Ohio.)

¹⁴ See, for example, Mark E. Parry, “Missouri’s Need for Risk Capital: An Assessment and Recommendations” (Kansas City: University of Kansas City – Missouri, 2007), and “The Greater Cleveland Venture Capital Report” (Cleveland: NorTech, 2006).

¹⁵ Michael S. Camp, PhD, presentation at the Ohio Capital Fund’s Ohio Early Stage Summit IV, September 17, 2008. This Fund is a fund of funds authorized by state legislation that utilizes contingent state tax credits as the “insurance” for loans to create the Fund’s principle. It is administered by Buckeye Venture Partners, LLC, a joint venture of Fort Washington Investment Advisors, Inc., and Peppertree Partners, LLC. For more information see www.ohiocapitalfund.com. At the same website can be found Dr. Camp’s presentation at the Ohio Early Stage Summit V in October, 2009, summarizing Ohio’s early stage investment record through 2008 and estimating Ohio’s need, through 2017, at \$4 billion to 1) keep the seed deal flow active, 2) account for increased valuations as companies mature, and 3) provide follow on funding for surviving firms. Dr. Camp characterized the assumptions underlying the \$4 billion estimate as “very conservative.”

¹⁶ Pittsburgh has been identified as one of the fastest growing VC regions. See National Venture Capital Association, “Fastest Growing Regions for VC Outside Silicon Valley” (2008), available at www.nvca.org. From 1997 to 2007, Pittsburgh’s VC investments grew from \$32 million to \$198 million and its VC-backed companies increased from 12 to 44.

¹⁷ The Minneapolis-St. Paul region may well be a true outlier. A combination of individual and corporate wealth, extensive business skills, and entrepreneurial talent appear to have created a climate for self-sustaining venture capital and associated business growth. It may also be worth noting that Minnesota is one of three Great Lakes states where the state’s share of national Gross Domestic Product in 2008 exceeded its share of population. The other two states are Illinois and New York. U.S. Census Bureau, available at <http://factfinder.census.gov>; and Bureau of Economic Analysis at www.bea.gov/regional/gsp.

¹⁸ The “virtuous circle” of successful deals begetting more success and more capital is nowhere better illustrated than by the seminal success of Fairchild Semiconductor, without which the now-iconic story of Silicon Valley would have been much different—it if had occurred at all.

¹⁹ It may be that strategies for sub-regions—such as collaborations among two or more metro areas—could be productive, but the questions of adequate scale in deal flow and the other key factors appear harder to address in the context of these smaller geographic areas.

²⁰ During an interview with the author, one distinguished venture capitalist based in the region characterized the problem not as risk aversion, but as lack of understanding: “It’s like an ox looking at a dollar bill,” he said, quoting a fellow venture capitalist.

²¹ An improved context may not even be necessary. The Youngstown Business Incubator, for example, located in one of the most depressed areas of the former steel region of western Pennsylvania and eastern Ohio, has made remarkable progress in creating a critical mass of business-to-business software companies through a sharp focus and outstanding leadership.

²² Martin Sandbu, “The Iraqi who saved Norway from oil” *Financial Times*, August 29, 2009.

²³ National Science Foundation, S & E State Profiles, available at www.nsf.gov/statistics/states.

²⁴ Based on 2006 data reported to the Association of University Technology Managers. Analysis is confined to universities and hospitals that reported five or more FTE’s assigned to their licensing offices. In both the Great Lakes states and elsewhere, there are large variations in technology transfer staffing and productivity, something the lagging institutions should try to correct.

²⁵ The Association of University Technology Managers, www.autm.net/source/STATT. Available to AUTM members or subscribers.

²⁶ The qualification “in the region” may be significant. If some Great Lakes institutions license their technologies comparatively often, then that technology is poised to be exploited *somewhere*. The low rates of venture investments in the region suggest that this exploitation—to the extent that it is financed by venture investors—occurs outside the region.

²⁷ “State of the Mid-America BioPharma Industry”, Daniel J. Broderick, conference presentation, Technology Development in the Region, Federal Reserve Bank of Chicago, March 22, 2005.

²⁸ Austin, “The Vital Center” and TradeStats Express, available at <http://tse.export.gov/>

²⁹ Austin, “The Vital Center.” Nowhere is Great Lakes business success more telling than in the region’s ability to produce goods and services that are valued in global markets. Even as many Great Lakes areas are challenged by manufacturing job losses, states in the Great Lakes region grew their share of total U.S.

exports from 27 percent in 2000 to 30 percent in 2007. Iowa and Ohio, in fact, increased their exports in every year during that period.

³⁰ Henry Chen and others, “Buy Local? The Geography of Successful and Unsuccessful Venture Capital Expansion,” Working Paper no. 1420371 (Harvard Business School Finance, 2009). Based on studying venture firms in Boston, San Francisco, and New York City, the authors conclude that venture firm “outperformance” was created by investments outside of their home office locations.

³¹ Much is sometimes made of the fact that because so many states and regions have picked healthcare technologies and services as target growth sectors, most are bound to be disappointed. With the nation’s 2007 health care spending consuming 16 percent of gross national product and \$2.3 trillion, there appears to be ample opportunity for many winners if they are clearly focused on creating competitive advantage and disruptive technologies, not just on creating more activity.

³² For a survey of changes affecting selected business sectors, see “Innovation in Global Industries: U.S. Firms Competing in a New World (Collected Studies),” Jeffrey T. Macher and David C. Momery, Editors, (Washington: The National Academies Press, 2008). The business sectors discussed are personal computing, software, semiconductors, flat panel displays, lighting, pharmaceuticals, biotechnology, logistics, venture capital, and financial services. Clayton Christensen’s discussions of disruptive technologies remain dramatic and relevant to the Great Lakes region. See Clayton M. Christensen, *The Innovator’s Dilemma: The Revolutionary Book That Will Change the Way You Do Business* (Boston: Harvard Business School Press, 1997) and (with Michael E. Raynor) *The Innovator’s Solution: Creating and Sustaining Successful Growth* (Boston: Harvard Business School Press, 2003). Examples of regional cross-disciplinary technological innovation include the partnering of digital information processing with medical radiography in Cleveland and Milwaukee and of glass manufacturing with solar cell technology in Toledo.

³³ For venture capital data, see Venture Impact, page 10. For estimates of angel capital investments, see Jeffrey Sohl, “The Angel Investor Market in 2008: A Down Year In Investment Dollars But Not In Deals” (Durham, NH: Center for Venture Research, 2009), available at www.unh.edu/cvr.

³⁴ Participation in a network does not ordinarily require that an investor make any specific investment. Although angel venture funds exist, angel networks do not as a rule manage an investment fund that is independent of the assets of the individual investors.

³⁵ All information in this paragraph from the University of New Hampshire Center for Venture Research, 2008 Angel Market Analysis Report, available at <http://wsbe.unh.edu/cvr>. This summary is currently the only publicly available source for national data on angel investors. The Angel Capital Education Foundation has begun to develop a database similar to that published by the National Venture Capital Association (NVCA) for venture capital. The Foundation’s data base will use Dow Jones/VentureSource data. See www.angelecapitalducation.org.

³⁶ In this table, angel networks are those that are members of the Angel Capital Association. It is probable that not all Great Lakes angel networks are Association members. An open access directory of venture capital firms that includes more than the NVCA data can be found at www.punctuative.com/vcdb/.

³⁷ Pensions & Investments, “The top 200 pension funds/sponsors,” available at www.pionline.com (January 21, 2008, reporting asset valuations as of September 21, 2007). Hereinafter cited as “P & I Top 200.” This 2007 data is for the public pension funds in the twelve Great Lakes states that are among the 200 largest U.S. pension funds. Pension funds specifically identified with New York City or Philadelphia in the P & I report have been excluded from these computations because they are not considered to be within the Great Lakes region as defined by Brookings.

³⁸ Pensions & Investments, “Funds among the top 200 with DB assets in venture capital”, available at www.pionline.com (January 21, 2008, reporting asset valuations as of September 30, 2007). Hereafter cited as “P & I Venture Capital”.

³⁹ P & I Top 200. This compares to the 2007 venture capital allocation of 1.1 percent made by the California Public Employees Retirement System (CalPERS).

⁴⁰ Dow Jones/VentureSource data, compiled by JumpStart, Inc. See also National Association of Seed and Venture Funds, “Venture Capital Report: State Experiences and Options” (2006), which suggests that the recent average of the Great Lakes share (including all of New York state and Pennsylvania) of national venture investments is around 14 percent.

⁴¹ Dow Jones/VentureSource data, compiled by JumpStart, Inc.

⁴² See www.indianainvestmentfund.com

⁴³ See www.osc.state.ny.us/pension/alternativeinvestments

⁴⁴ See www.ohioinvestmentfund.com

⁴⁵ See www.steelvalley.org/capital and www.heartlandnetwork.org.

⁴⁶ National Association of Seed and Venture Funds, “Venture Capital Report: State Experiences and Options” (2006). This report also provides a helpful “Benchmarks for Analyzing Program Options.” See Appendix C for a summary of do’s and don’ts for state programs.

⁴⁷ SRI International, “Making an Impact: Assessing the Benefits of Ohio’s Investment in Technology-based Economic Development Programs” (2009), available at www.ThirdFrontier.com.

⁴⁸ InnovationWorks, “Impact Results” (2006), available at www.innovationworks.org.

⁴⁹ The Chronicle of Philanthropy, “Grant-making at 131 Major Foundations” (2008).

⁵⁰ See the definition of program related investment at www.donorsforum.org. The Donors Forum site is principally focused on serving the Illinois philanthropic community, but is useful to anyone interested in philanthropy.

⁵¹ See www.brookepea.com/vectis-life-sciences.

⁵² Information on the Fund can be found at www.futurefundneo.org.

⁵³ See www.bioenterprise.com.

⁵⁴ Personal communication from Baiju Shah, President, BioEnterprise, Inc., November 6, 2009.

⁵⁵ www.archventure.com.

⁵⁶ The SBIR percentage excludes downstate New York and New York City and eastern Pennsylvania and Philadelphia. Because of the difficulty of disaggregating data collected on a statewide basis, all other percentages are figured using data for all of these two states, even though this includes data for areas that are outside the Great Lakes region as defined by Brookings. Pension fund data excludes pension funds specifically associated with New York City and Philadelphia, but includes state-wide Pennsylvania and New York pension funds.

⁵⁷ “Alphabetiasis” is a term coined to refer to the “alphabet soup” of multiple catalytic enterprises present in some communities, each with a lofty mission and committed stakeholders, but with budgets and talent pools that are inadequate. Closely related is “silos” the tendency of an organization to seek support and credit for itself, rather than for common objectives. Avoiding these problems in some metro areas may require simplifying and focusing resources on achieving shared outcomes. Simply stated, the objective for all relevant organizations in a metro region should be to create success for which credit is shared, not taken.

⁵⁸ Is it futile to argue about which comes first, entrepreneurial investors or company managers. Both are needed. This argument is another version of the sterile argument about which comes first—more deals or more dollars. Trying to accelerate one but not the other misses the point that both are necessary.

⁵⁹ Personal communication from Steven Lazarus, founding partner of ARCH Ventures, November 11, 2007. Lazarus believes that there is no single template for applying this concept; each university is different and must find its own method of being easy for investors to work with.

⁶⁰ Universities and other research institutions make much of their economic contributions to their communities, contending that they are unlikely to be out-sourced or down-sized. All this may be relevant in job creation and economic growth discussions, but it is beside the point in discussions about venture capital. This is because these kinds of contributions do not necessarily create the conditions necessary for realizing competitive investment returns from venture-backed growth companies that originate in institutional research.

⁶¹ With words that should be comforting to those in the Great Lakes region who are thought to be risk-averse, Peter Drucker approvingly quotes a successful entrepreneur who said that “I have never come across an ‘entrepreneurial personality.’ The successful ones I know all have, however, one thing—and only one thing—in common: they are *not* ‘risk-takers.’ They try to define the risks they have to take and to minimize them as much as possible. Otherwise, none of us could have succeeded.” Drucker goes on to say, “The innovators I know are successful to the extent to which they define risks and confine them.” Peter F. Drucker, *The Essential Drucker: In One Volume the Best Sixty Years of Peter Drucker’s Essential Writings on Management* (New York: Harper Collins, 2001), p 278.

⁶² One theoretical possibility is to exact a higher management fee, one substantial enough to cover the added costs of early stage investing. The pension and other institutional funds that are the Limited Partners of venture funds are not likely to agree to higher fees, especially for purpose of job creation or economic development, even though these positive effects would be felt in the home territory of their beneficiaries.

Indeed, higher fees for such purposes are likely to create little but skepticism and resistance from Limited Partners to the notion of an early stage fund. Even if higher fees were to be accepted, returns would be expected at a level high enough to cover the added fees. In an asset class where above average returns are difficult to achieve in the first place, expecting even higher returns is unrealistic as a means of justifying the higher costs associated with early stage investing. Another way to pay these very real costs must be found: costs cannot be passed on to the investors or they will (and should) go elsewhere.

⁶³ “Losers” here means those deals not likely to become large enough to create venture returns. Many companies that are too small for venture investment will be very profitable for their owners and contribute to employment and wealth creation.

⁶⁴ One example is the Mid-America Healthcare Investors Network, which exchanges information among early stage investors in the region. www.mhin.info or Dan Broderick at Prolog Ventures, dan@prologventures.com.

⁶⁵ The first round of investment for company growth is often called the “A round.” Later and usually larger rounds of investment are called the B and C rounds. The period of greatest vulnerability is between the A and B rounds because the B and later rounds typically include large investors who are not located in the Great Lakes region.

⁶⁶ Volunteer activity or in-kind contributions might be thought of as a third alternative. These non-cash contributions may have a role to play, but they are simply too modest and too uncoordinated to be meaningful. More importantly, they are not focused directly on achieving financial returns.

⁶⁷ Following references to “the Fund” or “a fund” should be understood to include both a single fund of funds or a planned succession of funds of funds. Both approaches are included in the overall concept of a “Great Lakes 21st Century Fund Initiative.” Other variations are no doubt possible, including a fund or family of funds that includes funds that specialize in assembling a variety of technologies through start-ups or buy-outs into a new enterprise. In the end, financial investors will “vote” with their investment decisions for the alternative they find most attractive.

⁶⁸ “We need more gatekeepers, not fewer!” vehemently stated one regional entrepreneur and early stage venture fund partner. Personal communication.

⁶⁹ The proposed Fund size is linked to estimates of early stage capital requirements in parts of the region, as well as to existing fund of funds activities that already exist in some Great Lakes states. It also seems commensurate with venture capital asset allocations of institutional funds in the region, to say nothing of the capacities of investment funds elsewhere. A Fund size of \$1 to \$2 billion is also chosen to dramatize the size of the opportunity and the resources needed to take advantage of it.

⁷⁰ These illustrations are simply that; they do not exclude other attractive opportunities.

⁷¹ See comments on the importance of internal communications in Steve Lazarus and Udayan Gupta, *Mind into Matter: ARCH Transforms Science into Sustainable Enterprise* (Gondolier Press, 2006), p. 116.

⁷² Illinois VENTURES, LLC, manages both a private venture capital fund and the Illinois Emerging Technology Fund. See www.illinoisventures.com. This is an example of public financing for the higher costs of managing early stage investing.

⁷³ Cambridge Associates LLC Benchmark Statistics for Funds of Funds, excluding secondary funds, as of June 30, 2007.

⁷⁴ This conclusion is based on data reported to and published by Pensions & Investments, “Funds among the top 200 with DB assets in venture capital,” as of September 30, 2008. As noted earlier, the largest public pension funds in the Great Lakes states (excluding funds associated with New York City and Philadelphia) reported allocations to venture capital totaling \$9.7 billion out of total assets valued at \$908.3 billion. See www.pionline.com and www.msbi.mn.state.gov.

⁷⁵ This idea originates with Richard Longworth, who has proposed a Global Midwest Forum that acts as “a roundtable for the region’s best minds to identify the issues and trends that assail the Midwest and set the agenda for future action.” Even though Longworth’s “Midwest” is not exactly coincident with the Great Lakes region, his idea is relevant, nonetheless. Also valuable is his thought that the several Federal Reserve Banks in the region overcome their historical failure to talk and work together. Longworth, “Caught in the Middle,” pp. 248 and 252.

⁷⁶ National Association of Seed and Venture Funds, “Venture Capital Report: State Experiences and Options” (2006).

⁷⁷ Congressional testimony suggests that this inhibition especially disadvantages venture-backed firms in the mid-west. See statement of Joshua Green to the Committee on Small Business, U.S. House of Representatives, April 22, 2009, www.nvca.org.

⁷⁸ These are key indicators that bear directly on whether university research and technology transfer operations are productive. Other indicators, e.g. licenses executed or patents granted, are not as reliable. One of the readers of this paper in draft correctly pointed out that this implies a positioning of university research to meet market needs, a point well understood by institutions such as Stanford and MIT. This is a more fundamental and complicated challenge for many universities than simply improving technology transfer performance.

⁷⁹ Translating university research into commercialized products not only contributes to a regional economy, but may provide some income that helps to offset declining state budgetary support and increasing student tuition. Accomplishing this outcome is a long term effort, however, one that will result from sharing in spin-off company growth and attracting more entrepreneur philanthropy, not from short-term license income.

⁸⁰ Richard K. Lester, “Universities, innovation, and the competitiveness of local economies: A summary report from the Local Innovation Systems Project—Phase 1.” Working Paper No. 05-010 (Massachusetts Institute of Technology, 2005).

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About the Author

Frank Samuel has been active for many years as a lawyer, trade association executive and catalytic organization leader concerned with medical technology start-ups and with governmental regulation and policy for the medical technology and health care industries. He has served on the advisory board of two early stage venture capital funds. His most recent professional position was Science and Technology Advisor to the Governor of Ohio, where he was a principal architect of Ohio's Third Frontier, one of the nation's premier State initiatives to encourage economic development through support of applied research, technology commercialization, and early stage capital creation.

Samuel currently serves on the National Advisory Council of the California Health Benefits Review Program and the Board of Directors of the Global Cardiology Innovation Center of The Cleveland Clinic. He chairs the Board of Directors of Providence Hospital in Washington, D.C. He has served as a member of Institute of Medicine advisory bodies on biomedical technology issues and as a member of several biomedical company boards of directors. Samuel is a graduate of Hiram College and Harvard Law School.

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