

STATE OF WISCONSIN INVESTMENT BOARD
Private Markets Group – Wisconsin Private Equity Portfolio

***WHITE PAPER ON
THE WISCONSIN VENTURE CAPITAL LANDSCAPE***

Executive Summary

Over the past nine years, a total of \$200 million has been allocated to the Wisconsin Venture Capital Portfolio (the "Portfolio") under four separate recommendations in 2000, 2003, 2005 and 2008. The Portfolio's strategy continues to be the ability to capitalize on the imbalance in Wisconsin and the Midwest between the recognized high levels of research and development occurring in the region and the disproportionately low levels of venture capital dollars seeking investments. This imbalance creates a highly inefficient market that offers an advantage to investors with deep connections to the research channels and the experience and skill to build companies to commercialize that research. The lack of competition for deals gives early investors the opportunity to invest at attractive valuations and to select the best opportunities.

Underlying the strategy is the understanding that venture capital investing involves time-intensive hands-on attention to each company. High transaction costs rule out long-distance investments, especially in seed-stage and very early-stage investments. Because of this, venture capital does not flow to the "best" ideas regardless of location as readily as other kinds of capital, creating local or regional market inefficiencies. In the face of evidence of a rich climate for emerging new technologies in a region, the lack of ongoing venture capital investment can signal an opportunity to invest, rather than a confirmation that no opportunities exist.

Section One provides background reconfirming what Staff believes to be opportunities for investment in Wisconsin by identifying the characteristics of the successful venture capital investment regions in the U.S. (especially the "technology centers" of Silicon Valley, Route 128 around Boston and the Research Triangle Park of North Carolina) and evaluating the current status of those characteristics in Wisconsin.

Section Two provides background on the commitments made by the Portfolio in four rounds totaling \$200 million. Mason Wells Biomedical Fund I and Venture Investors Early Stage Fund III, received \$45 million in total commitments, including the side-by-side commitment pool, in 2000. Frazier Technologies Fund II and Baird Venture Partners Fund I(B) received \$90 million in commitments, including the side-by-side commitment pool, in 2003. In 2004, a \$5 million Discretionary Fund was established, and in 2006 Venture Investors Early Stage Fund IV received \$30 million including the side-by-side commitment pool. A commitment was made to Mason Wells Biomedical Fund II in 2006, however was later canceled as a result of the general partner deciding to close down its venture capital group. And finally in 2008, a commitment was made to a venture capital fund totaling \$25 million (An official announcement on this investment will be made in the near future) and an additional \$15 million was added to the Discretionary Fund.

Section Three provides an overview of Staff's Investment Opportunities and Considerations that were presented as part of the overall recommendation to invest in Wisconsin venture capital opportunities.

Section One: Thesis behind Venture Capital investing in Wisconsin and the Midwest

Since the Wisconsin Private Equity portfolio's inception, Staff's investment thesis has been that there are quality investment opportunities based on the gap between the high quantity and quality of research and development supported in the state and the low level of capital for these types of start-up investments. This inefficiency creates opportunities for investors knowledgeable about the local market. The fact that there has been little interest from venture capitalists from the coasts is often used as evidence that opportunities do not, or cannot, exist. Staff believes there are opportunities for experienced investors with local knowledge and well-developed local and regional networks. Wisconsin and other areas around the Midwest have created a supportive atmosphere to encourage an entrepreneurial environment that can attract venture capital. This environment has been created due to the following factors: (I) World-Class Research and Development

Institutions; (II) Technology Transfer, the crucial first step in transferring intellectual property out of academic laboratories to start-up companies for commercial uses; (III) Corporate Catalysts with research and development functions that can be the source of capital, spin-off technologies and management talent for start-up companies, perhaps eventually acquiring the start-up and its technology or becoming customers of the start ups; (IV) Entrepreneurial and Support Concentrations (scientists, experienced management, venture capitalists, lawyers, accountants and other professionals) that can build start-up companies and, when those companies are successful, take their new wealth and repeat the cycle. A culture to encourage company formation and risk-taking underpins the entrepreneurial effort.

The presence of all of these characteristics creates a chain reaction that feeds new growth and investment success. In evaluating Wisconsin's current investment climate according to these characteristics, it is clear that Wisconsin has research institutions that rival the best of the venture capital centers, especially in life sciences. At the UW-Madison, in particular, Wisconsin also has the pioneering patent and licensing office in the nation, the Wisconsin Alumni Research Foundation (WARF). In the other two categories, Wisconsin has been weaker than the successful venture capital regions, but there is substantial evidence that these related infrastructure elements are developing quickly.

I. Research and Development Institutions

At the core of successful venture capital regions are the research and development engines. This is the essential requirement for the emergence of promising technologies in which to invest. For Wisconsin, this element is well developed primarily due to the University of Wisconsin-Madison's continued top ranking among other public and private universities competing for federal science and technology research grant dollars. In 2006, the UW-Madison's \$832 million in research and development expenditures (federal and non-federal funded) ranked second (first among public institutions) among the nation's academic research institutions as reported by the National Science Foundation (NSF). The UW-Madison's research generated the eleventh highest rate of invention disclosures per \$100 million in research spending in 2005 among top universities.

The UW's success has been the result of its commitment to interdisciplinary research which many feel is essential for breakthrough technologies. Interdisciplinary research projects are cross-disciplinary efforts that draw together members of faculty throughout the school to investigate ideas that change the way those involved think and act. An example at UW relates to the area of stem cell research which encompasses biomedical engineering, developmental biology, ethics and policy, neuroscience and hematology. The UW's interdisciplinary tradition is enhanced by facilities such as the Waisman Center, the Forest Products Laboratory, and the Wisconsin Institutes for Discovery. The Wisconsin Institute for Discovery is similar to the Clark Center for Biomedical Engineering and Sciences at Stanford University. The Wisconsin Institute for Discovery will combine both the public and private sectors in a facility to be constructed in the heart of the UW-Madison campus as a hub for interdisciplinary research. The \$150 million facility was made possible through a \$50 million gift from UW-Madison alumni John and Tashia Morgridge and matching funds from WARF and the State of Wisconsin. Construction has begun with an anticipated completion date of 2010. Other areas of the state are also experiencing a significant surge in research and development activity, driven by a number of academic and private institutions, providing a base for emerging technologies that will some day be commercialized. The more prominent institutions include: (1) The Medical College of Wisconsin, (2) The Milwaukee School of Engineering, (3) The University of Wisconsin-Milwaukee, (4) Marquette University, (5) The Blood Center of Wisconsin, and (6) Marshfield Clinic.

It should also be noted that behind the UW-Madison, 10 other Midwest universities rank among the top 50 Research Universities nationally, according to the NSA. The largest Midwest institution after the UW-Madison was the University of Michigan, which placed fourth with \$800 million in research and development expenditures. The clustering of high quality academic R&D institutions in the Midwest is important for two reasons. The first has to do with cross fertilization of ideas between universities. Academics are able to draw upon the expertise of others within close proximity to one another. This is already occurring between the UW-Madison and the University of Michigan. Second, with this core R&D hub in the Midwest, a greater number of investment opportunities should provide portfolio diversification and a greater focus from venture capitalists within the Midwest and on the coasts.

II. Technology Transfer

Wisconsin is a leader in technology transfer, with WARF perennially in the top-ten list of university technology transfer offices. Since 1925, WARF has processed more than 5,600 UW-Madison faculty and staff inventions and obtained 1,820 patents and 1,530 license agreements on those inventions. Currently, WARF manages more than 856 pending, and 933 issued, U.S. patents (plus 2,300 foreign equivalents); has a portfolio of more than 1,000 technologies available for licensing; and has more than 940 active license agreements (of which 282 are with Wisconsin companies). In the fiscal year ending June 30, 2007, WARF processed over 410 invention disclosures, filed 300 U.S. patent applications, obtained nearly 115 U.S.-issued patents and signed 60 new license and option agreements. A report by the Association of University Technology Managers ranks the UW-Madison and WARF in the top ten of gross license income for 2006. Other WARF related groups that help foster emerging technologies include: (1) WiCell Research Institute, a WARF non-profit established in 1999 to advance human embryonic stem cell research and therapeutic applications, (2) UW-Madison's Office of Corporate Relations, created to connect corporations to the UW's resources and promote entrepreneurial activities within the UW community and (3) WiSys Technology Foundation, another WARF subsidiary, that is designated to manage the intellectual property for all institutions of the University of Wisconsin System other than the UW-Madison.

III. Corporate Catalysts

Critical to a successful emerging technology environment is the presence of a good selection of well established businesses that are involved and interested in start-up opportunities. Corporate involvement can be beneficial to young start-ups in two areas, capital and talented management. Active corporate venture capital investing is defined as operating businesses investing directly in early stage/start-up companies, either on a sole basis or alongside traditional, independent venture capital funds. These businesses are in some cases referred to as strategic investors. Many times these strategic investors end up acquiring the start-up at some point in the future. The second benefit to young start-up companies is the pool of management talent that is available at these larger, more established businesses. Managers with deep technical and operating backgrounds will pursue new start-up opportunities for professional growth reasons, as well as to potentially increase personal wealth. Wisconsin is home to many businesses with significant R&D functions and cutting edge technologies.

The most prominent is Waukesha-based GE Healthcare Technologies, with a \$17 billion business in medical imaging and information technologies, patient monitoring and healthcare services. Not only is GE a major employer, it has been a serial acquirer buying Madison employers, Lunar Corporation and Datex Ohmeda (Amersham plc)). GE has been the training ground for many of the high level managers now employed at some of the local start-ups. These managers include: TomoTherapy (Fred Robertson, Ken Buroker, Delwin Coufal and Mary Klein), Collectar (William Clarke and Neal Sandy), NeuWave (Laura King), Third Wave (Kevin Conroy), EM System (Andrew Nunemaker) and PointOne Systems (Robert Pothier). Other valuable

corporate relationships to Wisconsin and the growth in emerging companies include: Shell Oil (formed strategic relationship with Virent Energy 2007), Microsoft (acquired Jellyfish.com in 2007), CSC (acquired NameProtect.com in 2007) TomoTherapy (successful completion of an IPO in 2007), Roche (acquired NimbleGen in 2007), CDW (acquired Berbee Information Networks in 2006), Cardinal Health (acquired Gala Design in 2003), Genzyme (acquired Bone Care in 2005), Hologic (announced in June 2008 its intentions to acquire Third Wave), Affymetrix (formed a strategic distribution agreement with NimbleGen in 2007), Bayer HealthCare and Promega (entered into commercial agreements with EraGen), EMD Biosciences (acquired Novagen in 1997), Sigma Aldrich (acquired Tetrionics in 2004), Covance (completed a \$50 million facility expansion in Madison, its third expansion in Wisconsin for the drug testing company) and Doosan (partnered with Nutra-Park in 2000).

IV. Critical Mass or Concentration of Entrepreneurs and Resources

The Wisconsin venture capital landscape has been changing over the past ten years stimulated by both public and private efforts to capitalize on the research and development wealth of the state. Years ago, the most elusive of the key characteristics of venture capital and technology centers in the state was having a “critical mass”, or the point at which entrepreneurs and resources coalesce into a technological, cultural and economic network that is not just self-sustaining but growing rapidly. Once this critical mass is formed in a certain region, a new ecosystem develops. Wisconsin is closer than ever to forming the critical mass necessary to develop this venture capital sub-culture. Some of the more critical components of this critical mass and the evolutionary process here in Wisconsin include the following:

Technology Industry and Investor Networks: In regions where there are high levels of venture capital, entrepreneurs and resources are concentrated in relatively small areas, providing investors and start-up companies an opportunity to quickly learn about one another. In the past, both founders and investors in Wisconsin worked in relative isolation. Today, new groups have been organized to link founders, entrepreneurs and investors. A few of these groups include: (1) Wisconsin Technology Council, (2) Wisconsin Biotechnology and Medical Device Association and (3) Wisconsin Association for Biomedical Research and Education. All three organizations have promoted technology and entrepreneurship leading to new industry networks (Mid-America Healthcare Investors Network, Biotechnology Industry Organization and the Wisconsin Innovation Network). These cooperative efforts recognize the need for the entire region to pool its resources and to create the kind of efficient knowledge transfer and interaction that occurs more naturally in a concentrated area such as Silicon Valley.

Research Parks: In recent years, there has been substantial public and private investment in research parks and business incubators, especially but not exclusively at universities. These initiatives serve as an important mechanism for stimulating technology transfer, the formation and growth of high-tech entrepreneurial start-ups, regional economic development and revenue for firms and universities. The creation of research parks and business incubators was the initial seed planted in Silicon Valley by Stanford University and in Raleigh-Durham, North Carolina. The research park concept was brought to Madison in 1984 when the University Research Park (“URP”) was formed through the collaborative efforts of the University of Wisconsin-Madison and both local and state governments. URP is a not-for-profit corporation that is operated for the University to encourage and promote scientific, technological and educational opportunities. All income that is generated by URP is distributed to the University to assist in further scientific and technological investigation and the transfer of knowledge. Today, URP is home to 114 tenants in 34 buildings with more than 1.5 million square feet of office and laboratory space. Recently, URP officials announced plans to build a new, 65,000-square-foot “accelerator

building” to house life-science companies that have moved beyond early-stage development. This will be the second “accelerator” facility in URP history. In addition, URP has announced its Phase II plans to expand the park further west toward Middleton (located on the large parcel of land at the corner of Mineral Point Road and Highway M). Other private Dane County incubator/start-up facilities that have been recently developed include the Fitchburg Technology Campus on Madison’s southwest side, the TEC Incubator Center located across from MATC and the Novation Campus on the south side of Madison. An indication that local business/investors in the community see opportunities in technology start-up companies has been the number of high technology facilities developed and the ability of these start-up companies to find private developers/real estate investors to construct and lease specialized single use buildings. Milwaukee County has also been working to develop its own research park, The Milwaukee County Research Park Corporation (MCRPC). The MCRPC was created to manage the development of a university-related research park on 175 acres in Milwaukee County. The park supports technology-based companies, strengthens Milwaukee County's business base, creates new employment opportunities and facilitates technology commercialization. This objective is being accomplished by bringing together the substantial academic, intellectual, business and entrepreneurial resources of the metropolitan Milwaukee area in a physical environment conducive to such activities. The MCRP includes the Technology Innovation Center, a business incubator supporting more than 77 firms since inception with wet labs, offices and conference rooms with ready access to the corporate and university affiliates of the park.

Tax Policy Initiatives: As Wisconsin’s manufacturing economy continues to suffer from recession and pressure from global competition, public policy has focused on using tax credits to stimulate investments in businesses engaged in emerging technologies. The Wisconsin Act 255 was created to provide tax credits for angel investors and seed capital funds, provide other funding sources through technology development grant programs and a technology venture loan fund. Governor Doyle is currently proposing a follow-up initiative called Accelerate Wisconsin, which will focus on expanding Act 255 and other early stage initiatives.

Angel Groups: Angel investors, usually high net worth individuals, traditionally are the first outside investors in a start-up company, after “friends and relatives” and before venture capital funds invest. Wisconsin’s angel groups received a boost with the creation of the Wisconsin Angel Network (WAN). WAN provides resources for angel groups, enhances deal flow, provides professional guidelines for screening deals, diversifies angel portfolios and connects angel groups and entrepreneurs. WAN, a collaborative effort between the Wisconsin Departments of Commerce, the Wisconsin Department of Financial Institutions and the Wisconsin Technology Council, assists entrepreneurs to find and secure angel financing. There are now 16 angel groups in Wisconsin, up from six in 2004.

Recruiting Professional Management: Access to experienced managers is important for emerging companies. Start-ups with great science and adequate access to capital can fail if they cannot attract experienced financial, operating and marketing executives. In the technology centers of the U.S., the concentration of start-up companies provides opportunities for experienced managers to move readily between companies and find new employment if their employer is acquired or fails. It has been difficult to convince executives with start-up experience to relocate their families to Wisconsin and the Midwest where alternative employment might be hard to find. But as outlined previously, this obstacle is less today than it was ten years ago.

Coastal Investors: Although far from where many would like to be as far as attracting coastal venture groups, Wisconsin companies are seeing some increased interest. A few examples are Skyline Ventures,

a Palo Alto, CA based venture capital firm that invested in NimbleGen, and Avalon Capital, a LaJolla, CA based venture capital firm that invested in TomoTherapy.

Serial Entrepreneurs: In the technology centers around the country, the chain reaction really began when successful entrepreneurs reinvested their personal wealth and expertise to start additional new companies. The section above on corporate catalysts gives some indication of this process emerging in Wisconsin. A few of the local serial entrepreneurs include: Brian Wiegand (founder of BizFilings, NameProtect.com and Jellyfish.com), Ralph Kauten (PanVera) and Bill Linton (Promega).

Section Two: Wisconsin Private Equity Initiative Background

Over the past nine years, the Portfolio has invested in four venture capital partnerships that have focused on Wisconsin and Midwest venture capital opportunities. The investments were made following Staff led searches with the support of consultants, for private equity funds focusing on this particular niche. Underlying these partnership investments is the premise that an investment opportunity arises from the mismatch between the high quality and quantity of research and development in Wisconsin and Midwest academic and medical research institutions and the low levels of venture capital seeking opportunities in the area. In this inefficient market, investors with deep connections to the research channels should be able to find attractive opportunities at attractive valuations.

As of December 31, 2007, the Portfolio held investments in five venture capital funds actively seeking investments in Wisconsin. Through side-by-side co-investment agreements, SWIB also held direct investments in five venture-stage companies operating in Wisconsin.

These investments were originated by a direct Board of Trustee action. The first fund initiative was authorized in April 1999 when SWIB's Trustees approved a proposal to invest up to \$50 million in nonpublic healthcare and biotechnology companies in Wisconsin and the Midwest. Out of the \$50 million, \$45 million was allocated to two venture capital funds: Mason Wells Biomedical Fund I (MWBF I) and Venture Investors Early Stage Fund III (VIESF III). Both of these funds began investing in 2000.

The second fund initiative approved by the Board in 2002 was to invest up to \$100 million in venture capital funds active in Wisconsin. The investment focus was extended to all emerging technologies rather than being limited to healthcare and biotechnology. In April, 2003, a total of \$90 million was allocated to Baird Venture Partners Fund I(B) and Frazier Technology Ventures II.

In 2004, Staff received approval from the Board for the authority to directly invest up to \$5 million in follow-on venture capital investments in Wisconsin Companies where SWIB already held or would hold an interest in a company as a side-by-side investment with one of its for current venture capital funds. The \$5 million was carved out of the \$15 million that had been unallocated under the 1999 and 2002 Wisconsin Private Equity initiatives. The fund was necessary to protect SWIB's investment from dilution during follow on rounds where the side-by-side commitment was not enough for SWIB to participate in its pro rata share. The \$5 million fund for internal purposes is known as the Discretionary Fund.

The third fund initiative approved by the Board in December 2005 was to invest up to \$50 million in nonpublic healthcare, biotechnology and emerging technologies located in Wisconsin and the Midwest. Out of the \$50 million, up to \$20 million, including a side-by-side commitment was allocated to Mason Wells Biomedical Fund II (MWBF II) and up to \$30 million, including a side-by-side commitment, was allocated to Venture Investors Early Stage Fund IV (VIESF IV). VIESF IV began investing these funds in 2006. The Mason Wells Fund II commitment was canceled as a result of the general partner's decision to close down its venture capital group.

The fourth and final initiative approved by the Board as part of the initial \$200 million allocation was given in May of 2008 to invest up to \$25 million in a new venture capital fund with no side-by-side commitment allocation (a formal announcement of this commitment will be made in the near future). The proposed new fund does not have a mandated geographic limit in their partnership agreements, but the local nature of venture capital investments and the particular strategy of this fund make it clear they will focus on opportunities in Wisconsin and the Midwest if they fit the funds general strategy. Also, as part of this initiative, the Discretionary Fund was increased an additional \$15 million and modified to (1) Allow staff to make direct investments in companies that have been funded or will be funded by one of the current venture capital relationships SWIB has supported (Mason Wells Biomedical Fund I, Venture Investors Fund III and Fund IV and Baird Venture Partners Fund I(B) and the new venture capital fund that SWIB recently committed to) and (2) Invest in opportunities of up to 30% of the Discretionary Fund outside of Wisconsin to further diversify portfolio holdings and take advantage of good opportunities outside of the state. Moving away from the directed side-by-side commitment model creates additional flexibility for Staff. Historically we have seen some funds call down all of their side-by-side commitment while others have called nothing. Structuring of the Discretionary Fund, as proposed, will allow Staff to allocate dollars where necessary (i.e. protect from dilution or take advantage of a lower risk investment opportunity such as the top-off round).

Table I (below) shows a breakdown of the allocations to each of the five funds, the related side-by-side commitments and the Discretionary Fund.

| Fund Name | Total Fund Raised | SWIB Commitment | SWIB Side-by-Side |
|-----------------------------------|--------------------------|------------------------|--------------------------|
| Mason Wells Biomedical Fund I | \$43,000,000 | \$20,000,000 | \$5,000,000 |
| Venture Investors Early Stage III | \$37,076,000 | \$15,000,000 | \$5,000,000 |
| Baird Venture Partners I(B) | \$70,000,000 | \$25,000,000 | \$5,000,000 |
| Frazier Technology Ventures II | \$104,445,000 | \$50,000,000 | \$0 |
| Discretionary Fund | | \$5,000,000 | |
| Venture Investors Early Stage IV | \$117,651,515 | \$25,000,000 | \$5,000,000 |
| New VC Commitment | | \$25,000,000 | \$0 |
| Discretionary Fund | | \$15,000,000 | |
| TOTAL | | \$180,000,000 | \$20,000,000 |

Table II provides a listing of SWIB's side-by-side and discretionary investments. Of these nine, the investments in Gala Design, NameProtect, TomoTherapy and NimbleGen have been realized.

| Table II: Total Companies Funded by SWIB backed Venture Firms (as of December 31, 2007) | |
|--|----------------------|
| Side-by-Side Investment | Managing Fund |
| Gala Design <i>[Exited]</i> | MWBF I, VIES III |
| TeraMedica | MWBF I |
| NimbleGen Systems <i>[Exited]</i> | VIES III, BVP I |
| NameProtect <i>[Exited]</i> | MWBF I |
| OpGen | MWBF I |
| TomoTherapy <i>[Exited]</i> | VIES III, BVP I |
| ZyStor Therapeutics | MWBF I, VIES III |
| Pinstripe, Inc. | BVP I(B) |
| Caden BioSciences | BVP I(B), VIES III |

Section Three: Investment Opportunities and Considerations

Investment Opportunities

The rationale for opportunistic investments in Wisconsin and Midwest venture stage companies is:

1. The imbalance between the high quantity and quality of research and development supported in the region and the low levels of venture capital dollars offered for investment.
2. It is a highly inefficient market that affords investors with deep connections to the local or regional research channels the opportunity to find attractive investments at very attractive valuations.
3. Investors who are willing to invest early benefit from better pricing and less competition for the best deals, and often get the first look at new opportunities as well.
4. The relatively lower cost of operating a business in the region compared to the coasts allows a business to get more value out of each dollar invested.
5. Because of the intense hands-on nature of venture investing, venture capitalists invest close to home. Therefore, unlike other forms of capital, venture capital does not flow easily to all regions of the country and the lack of venture capital in an area need not be a sign of poor investment opportunities. Almost by default, investing in venture capital funds involves a geographic play.
6. If the analysis shows that the conditions for successful venture capital investments exist, investors familiar with that area have an advantage.
7. The R&D institutions and technology transfer characteristics of Wisconsin rival those of other technology centers in the U.S.

8. The conditions for the other factors (corporate catalysts and a concentration of entrepreneurs and resources) exist, are stronger than they were back in the 1999/2000 period and continue to develop quickly.
9. We have seen that there are compelling companies and technologies to invest here locally with the recent investment realizations in NameProtect.com, TomoTherapy and NimbleGen. Local opportunities do exist and can be very profitable for investors.
10. With only a few venture capital funds actively prospecting in Wisconsin, it takes only a small number of opportunities like TomoTherapy or NimbleGen to deliver market rate returns for those portfolios specializing in the market.
11. As the environment improves, the investment risk related to an underdeveloped "infrastructure" is being reduced. SWIB's prior investments have contributed to the emergence of this infrastructure. Continuing to invest now will allow SWIB to benefit from the groundwork built by its earlier investments when the risk was higher.
12. The Portfolio's returns have started to improve over the past 12 months as a result of the three exits in 2007 and write-ups in value in a few of the portfolio companies. Based on the December 31, 2007, the Portfolio's actual returns for the one-year and three-year period was 61.4% and 18.9%, compared to the Venture Economics Venture Capital Weighted by Vintage Year returns of 18.3% and 11.3%. Both the five-year and ten-year returns at 8.7% and -.5% respectively were below the benchmarks of 16.2% and 10.4%. We believe these returns will improve over time as we continue to see investment realizations within the funds.

Investment Considerations

Venture capital remains a high-risk investment strategy. On a portfolio basis, the general expectation is that one-third of investments will be total losses, one-third to one-half will not lose money but will not contribute much return and less than one-third of the investments will be highly successful and raise the portfolio returns to an acceptable level.

As with other private equity investments, venture capital investments are highly illiquid. Further, seed- and early-stage investments in the life sciences, in particular, take much longer to achieve a successful exit compared to information technology or business services. Investments in medical devices or drug development companies will require extended periods and multiple rounds of financing before regulatory approval is granted and products are commercialized and marketed. Venture funding of \$100 million or more is often needed for companies in these highly regulated industries, posing an additional risk. Venture capital companies can be vulnerable because they may have only one product line, larger competitors may be more successful in bringing similar products to market or rapid changes in technology may result in early product obsolescence.

For a public pension fund, the probability of losses, especially early losses before successful investments are visible, can be a particular risk if beneficiary groups are uncomfortable with the underlying strategy. The extent of this risk can be lessened if it is acknowledged from the start that losses are inevitable and accounted for in overall expected returns.