Tennessee Technology Development Corporation

Annual Report to Governor and General Assembly

November 1, 2008

Letter from the CEO

November 1, 2008

The Honorable Phil Bredesen, Governor and
Members of the Tennessee General Assembly:

It is my privilege to send to you this annual report on the structure, operation and financial status of the Tennessee Technology Development Corporation, a private, not-for-profit corporation created by the state legislature to design and implement innovation-based development strategies. This report is required by statute to be sent to you annually on November 1 of each year.

Following a period of operational dormancy, the Tennessee Technology Development Corporation (TTDC) was revitalized to serve the state through a contract with the Tennessee Department of Economic and Community Development in September 2007. Although TTDC was created by legislation in 1998, because of the recent dormant period of evaluation and consideration, TTDC is a development stage organization, as reflected in this report.

Historically and in comparison to competing U.S. states and foreign nations, Tennessee has not invested substantial resources in a "competitiveness agenda" designed to coordinate technology-based economic development (TBED) programs on a statewide basis. Therefore, it is the burden of TTDC – our management, directors, partners and stakeholders – to make the case that state-level coordination of TBED investments will deliver substantially better economic returns for the State than simply returning those funds to taxpayers.

On behalf of the board of directors and management of TTDC, I thank you for the opportunity to serve Tennessee with excellence through the development of this organization. We embrace the opportunity and challenge to earn the trust of our stakeholders – elected officials, scientists, technology entrepreneurs, risk capital investors and, ultimately, every citizen in the state of Tennessee – such that our organization is relied upon as the credible adviser and manager of state investments in TBED activities.

Respectfully Yours,

Eric C. Cromwell
President & CEO

Table of Contents

I. Structure

The Tennessee Technology Development Corporation (TTDC) is uniquely positioned to provide an essential service to state government – to ensure that Tennessee is competitive for high-wage, high-skilled jobs created by technological innovation and high-growth entrepreneurship.

Created by the Legislature in 1998, TTDC is similar in structure to many state-sponsored technology-based economic development (TBED) organizations in the U.S.:

- TTDC is a not-for-profit 501(c)(3) corporation created by the state but intentionally positioned outside state government.
- As a quasi-public/private partnership, TTDC can enter into certain transactions that a government agency cannot, such as financially supporting both private sector non-profit organizations and for-profit businesses.
- As a non-profit corporation, TTDC can receive grants from private foundations and government agencies (e.g. U.S. Economic Development Administration). However, the vast majority of financial support for state service organizations like TTDC comes from direct state government support – either through general fund appropriations, special bond issues or a share of revenues from specific sources, such as tobacco settlements or lottery revenues.

To date, TTDC has not received consistent financial support from state government on par with peer state investments. Many states have consistently invested in TBED programs and services at much higher rates. For example:

- In its first 15 years, the Georgia Research Alliance (GRA) leveraged $450 million in state funding into $2 billion of additional federal and private investment. In particular, GRA pioneered the strategy of recruiting "eminent scholars" as a technology-industry economic driver.[i]
- The Kansas Technology Enterprise Corporation (KTEC) has leveraged more than $200 million in state funding since its inception into more than $1 billion of additional federal and private investment. In 2006, KTEC's recurring annual state support was $11.4 million. KTEC also led the development of the 2004 Kansas Economic Growth Act, a 15-year, $580 million initiative to stimulate economic growth in the biosciences. In fiscal year 2009, Kansas will make $52 million of new investments in strategic research and targeted services to support the bioscience industry in Kansas.[ii]
- Maryland also created its TBED program in 1998, the Maryland Technology Development Corporation. "TEDCO" began receiving substantive state support in 2001 and became the state's key partner in securing federal funds for TBED programs. By 2006, TEDCO's annual budget was more than $10 million. In 2008, Maryland's governor announced plans for a 10-year, $1.3 billion investment of state funds in biotechnology-related TBED programs.[iii]

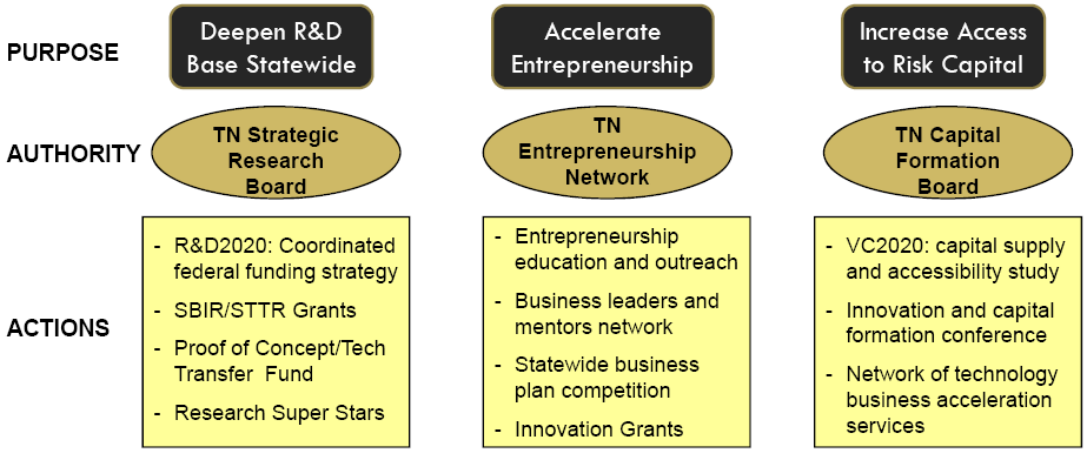
The regions, states, and nations that effectively diversify their economies via strategic development strategies will realize higher rates of job creation, specifically in high skill, high wage industries. For this reason, it is imperative that Tennessee learn from competing states and nations as a precursor to investing in the right mix of development strategies capable of improving our state's competitiveness in this challenging economic environment.

I. Structure

TTDC represents a coalition of industry, academic, and government leaders committed to advancing a "competitiveness agenda" that fosters innovation and entrepreneurship – the keys to state and national competitiveness. TTDC management actively collects and develops information about competitive programs from other states with technology-based economic development objectives that:

- Strengthen and leverage research institutions as economic drivers;
- Transfer technology from research institutions to the marketplace;
- Create a business environment conducive for high-growth entrepreneurship; and
- Increase the availability of and access to risk capital for business growth.

The development stage plan of TTDC can be summarized by the following graphic:



Statewide alignment is critical to our future success in serving the state of Tennessee. The lack of a sufficiently-funded and capable statewide organization to coordinate the interests and efforts of regional initiatives to secure state support has most likely led to Tennessee's substantial underinvestment in technology-based economic development initiatives. Innovation is, and will be, the defining factor in future economic growth, and it is essential for public and private sectors to work together in a synchronized approach to make the most of every expansion opportunity.

If Tennessee were to make future strategic investments in technology-based economic development initiatives, TTDC is positioned to be the state's *trusted advisor* on the structure, operations and financial models for such investments. TTDC was created to serve the state of Tennessee. We are a non-profit corporation committed to upholding the highest governance standards. Unlike for-profit solicitors of state support, TTDC does not have a financial stake in the outcomes of specific investments. TTDC can serve Tennessee's public sector leaders by providing verifiable information about technology-based economic development best practices and credible analyses of future investment opportunities for the economic benefit of this great state.

I. Structure

A. TTDC Mission and Duties Assigned by the Tennessee Legislature

The purposes of the corporation are:

a) To contribute to the strengthening of the economy of the state through the development of science and technology; and

b) To promote the development of Tennessee businesses by supporting the transfer of science, technology, and quality improvement methods to private and public enterprises.

Duties of TTDC as provided in statutes:

1. Assist in evaluating statewide innovation capacity as measured by new technology business starts, research disclosure and patent generation, venture capital availability and investment, public and private research and development expenditures, and research commercialization efforts;

2. Assist in the development, attraction and retention of diverse high skill and high wage jobs in Tennessee and attract prominent leaders in industry, research and education to Tennessee, ensuring the talent exists within Tennessee to foster innovation;

3. Support and improve technology transfer and commercialization mechanisms from research organizations, universities and business;

4. Increase the availability of capital to perform applied research, develop technology and stimulate new technology business creation and growth in Tennessee;

5. Assist in the development of physical infrastructure required for a technology and innovation driven economy;

6. Stimulate entrepreneurship and create an entrepreneurial culture in Tennessee;

7. Assist in establishing cooperative and collaborative associations between universities, research organizations, and private enterprises in Tennessee for the purpose of coordinating research and development programs that will aid in the creation of new products, services and jobs in Tennessee; and

8. Provide financial assistance through contracts, grants and loans to programs of scientific and technological research and development.

B. Board of Directors

TTDC is governed by a 22-person board of directors. As of November 1, 2008, there were three vacancies on the board. For the list and contact information of the active board members, see the Appendix at the end of this document.

By law, fourteen of the board members are to be appointed from the private sector – three are appointed by the governor, two each by the speaker of the house and the speaker of the senate, and seven by the TTDC board.

Seven board members are to be appointed from the public sector – three by the governor and two each by the speaker of the house and the speaker of the senate. Of these board members, one of the governor's appointees is to be selected from a slate of three candidates provided by the Tennessee Municipal League or the Tennessee County Services Association. Mayor Bill Haslam of Knoxville fills this seat on the board.

The commissioner of economic and community development, currently Matt Kisber, is an ex officio member of the board.

Dr. William Evans, CEO and Director of St. Jude Children's Research Hospital, was elected chair of the board by members present at the July 17, 2008 board meeting and was subsequently approved by unanimous consent by all active board members. Dan Marcum is immediate past-chair and remains a member of the board.

The board has an executive committee charged with administering the day-to-day operations of TTDC. Dr. Evans chairs this five person committee. The board is in the process of nominating members to serve on two additional oversight committees – audit and compliance; and governance and organization.

C. Operating Committees

At the April 3, 2008 meeting, the TTDC board created four strategic operating committees that have certain characteristics of stand-alone boards. These committees will provide thought leadership and strategic direction on complex issues affecting economic growth in the 21st century. The committees will include TTDC directors as well as individuals recognized throughout the state for their specific expertise:

1. The **TN Strategic Research Board (TSRB)** will advise and direct state investments that support and grow the technology research base in Tennessee, facilitate sponsored research between private sector companies and universities, and increase the flow of innovations from laboratories to the private sector.

2. The **TN Capital Formation Board (TCFB)** will advise and direct state investments that increase the supply and accessibility of risk capital investment for high-potential technology businesses.

3. The **TN Entrepreneurship Network (TEN)** will create a statewide network of entrepreneurship support systems that serve a general public interest but also identify high-potential technology entrepreneurs for customized support services.

4. The **TBED Partners & Stakeholders Board (TPSB)** will ensure that TTDC resource allocation decisions are fully informed by the leaders of established organizations in Tennessee that are engaged in technology-based economic development (TBED) activities.

Through this organizational structure, TTDC will maintain a relatively small staff while aspiring to retain highly competent professionals with the ability to interact with scientists, venture capitalists and technology entrepreneurs as respected peers.

D. Management Team

Eric Cromwell is president and CEO of TTDC. Previously, Eric served as the state's first ever Director of Technology Development within the Tennessee Department of Economic and Community Development. During his time in state government, Eric held leadership roles in a range of programs and projects as the Bredesen Administration began a comprehensive process to review new, innovative development strategies targeted at fostering innovation. Eric began his career in technology-based economic development in Memphis as the founding director of EmergeMemphis, a technology business incubator, and later as the founding associate director of the FedEx Institute of Technology, a public-private initiative established to support advanced research and higher education.

Dan Schmisseur is vice president with responsibilities for TTDC's operations and strategy. Dan joined TTDC in June 2008 following a five-month consulting engagement during which he helped design TTDC's development stage strategy. Previously, Dan had worked as vice president of strategy and policy with the Kansas Technology Enterprise Corporation, a public-private partnership that served as a model for the legislative creators of TTDC. Dan began his career as a CPA with Price Waterhouse in Cincinnati, launched an entrepreneurial venture in Austin in 2000 that he owned and operated for four years, and learned the fundamentals of technology-based economic development while working as a consultant on projects with the IC^2 Institute at the University of Texas at Austin.

Kristen Anderson, J.D. is director of policy and compliance with responsibilities for TTDC's governance systems, contractual arrangements and legislative communications. Previously Kristen was an associate with Baker Donelson in the firm's Nashville office, and she is a graduate of the University of Tennessee College of Law.

James Stover, Ph.D. is director of capital formation with day-to-day responsibilities for the programs and services overseen by the Tennessee Capital Formation Board. James holds a PhD in Chemistry from Vanderbilt University and, after serving as a senior research fellow in medicinal chemistry at the Scripps Research Institute - California, worked as a life science/healthcare analyst with Square 1 Bank in San Diego.

Kate Borkon is director of research with responsibilities for economic development data and metrics, the SBIR/STTR Phase 0 grant program, and general support of EPSCoR and the Tennessee Strategic Research Board initiatives. Previously Kate was an economic analyst with the Department of Economic and Community Development.

Sara Ebert manages TTDC office and administrative processes. Previously Sara worked for a non-profit trade association in San Diego.

TTDC management intends to maintain a small organization headcount while leveraging the operational capabilities of existing organizations providing technology-based economic development programs and services throughout Tennessee and supporting the development of new capabilities in underserved regions. With this leveraged operations plan, TTDC will rarely perform the services of the "customer facing organization." Instead, TTDC is positioned to manage strategic state investments in TBED programs and services operated by organizations that leverage federal funds or regional philanthropy and aspire to meet the highest operations and performance standards for peer organizations.

A. Contract with Department of Economic and Community Development

As a state-sponsored organization tasked with specialized economic development functions, TTDC operations are dependent upon state funding – currently a $5 million endowment grant contract from the Tennessee Department of Economic and Community Development. The contract term commenced October 1, 2007 and ends June 30, 2009. TTDC has notified ECD of a request for an extension of the contract performance period until June 30, 2010 in order to provide sufficient time to implement development stage programs and demonstrate the value proposition of continued state support for technology-based economic development programs and services.

Contract revenues are recorded based on actual project expenditures relative to revised estimates of total project expenditures and/or as project milestones are achieved. Payments on contracts are recorded as unearned revenues when received in advance of performance.

The following table illustrates how contract performance requirements align with the proposed oversight responsibilities of TTDC operating committees. The TTDC Audit and Compliance committee will have oversight responsibility for monitoring contract performance and ensuring that management is complying with applicable state laws and regulations.

ECD Contract Scope of Services:	TTDC Operating Committee Responsibility Allocations:
1. Assist in evaluating statewide innovation capacity as measured by new technology business starts, research disclosure and patent generation, venture capital availability and investment, public and private research and development expenditures, and research commercialization efforts;	**TSRB**: research disclosure and patent generation; public and private R&D expenditures **TCFB**: venture capital availability and investment **TEN**: new technology business starts **TP&S**: research commercialization efforts

ECD Contract Scope of Services:	TTDC Operating Committee Responsibility Allocations:
2. Assist in the development, attraction and retention of diverse high skill and high wage jobs in Tennessee and attract prominent leaders in industry, research and education to Tennessee, ensuring the talent exists within Tennessee to foster innovation;	TTDC HQ will assist ECD and **TP&S** on ad hoc basis as opportunities arise to attract businesses or talent to Tennessee. **TSRB** will evaluate programs to support the state's leading research institutions in attracting "eminent scholars" or other unique R&D capabilities.
3. Support and improve technology transfer and commercialization mechanisms from research organizations, universities and business;	**TSRB** will consider forming a technology transfer taskforce involving the leaders and subject-matter experts from the state's R&D institutions and private sector businesses.
4. Increase the availability of capital to perform applied research, develop technology and stimulate new technology business creation and growth in Tennessee;	**TCFB** will be tasked with developing programs to increase the supply and accessibility of risk capital investments in Tennessee technology businesses.
5. Assist in the development of physical infrastructure required for a technology and innovation driven economy;	TTDC HQ will assist ECD and **TP&S** on ad hoc basis as opportunities arise to support the development of physical infrastructure.
6. Stimulate entrepreneurship and create an entrepreneurial culture in Tennessee;	**TEN** will be tasked with developing programs relevant to this task.
7. Assist in establishing cooperative and collaborative associations between universities, research organizations, and private enterprises in Tennessee for the purpose of coordinating research and development programs that will aid in the creation of new products, services and jobs in Tennessee; and	**All** operating committees will support TTDC HQ in identifying opportunities to facilitate greater coordination of resources within Tennessee to achieve results that exceed expectations from the sum of individual efforts.
8. Provide financial assistance through contracts, grants and loans to programs of scientific and technological research and development.	**TSRB** will be tasked with evaluating a Proof-of-Concept grant program for the purpose of increasing the quantity and quality of research institution innovations that ultimately attract risk capital investments; and a Matching Funds grant program for the purpose of maximizing federal R&D grant awards.

B. Development Stage Strategy

TTDC has segmented its development stage plan into three core segments of need to address with focused initiatives for optimal results:

1. **Strategic Research** – deepening the R&D base statewide in support of a strategic initiative to leverage existing research infrastructure and align on an economic development competitiveness agenda;

2. **Capital Formation** – increasing the supply and accessibility of risk capital investment for high-growth Tennessee companies; and

3. **Technology Entrepreneurship** – supporting and developing the social and professional networks that connect high-potential entrepreneurs to the knowledge capital and leadership capital that significantly improves rate of success.

Following is a brief description of these segments and the programs TTDC management is developing with oversight from the TTDC board and its operating committees:

The **Tennessee Strategic Research Board** (TSRB) will facilitate sponsored research between private sector companies and universities, increase the flow of innovations from laboratories to the private sector, and advise or direct state investments that support and grow the technology research base in Tennessee.

As an operating committee of the TTDC board, TSRB will be tasked with leading the following performance responsibilities related to the Innovation Tennessee contract:

- (scope of services #1) *Assist in evaluating statewide innovation capacity as measured by … research disclosure and patent generation….public and private research and development expenditures, and research commercialization efforts*;

- (scope of services #2) *Attract prominent leaders in industry, research and education to Tennessee, ensuring the talent exists within Tennessee to foster innovation*;

- (scope of services #3) *Support and improve technology transfer and commercialization mechanisms from research organizations, universities and business*;

- (scope of services #7) *Assist in establishing cooperative and collaborative associations between universities, research organizations, and private enterprises in Tennessee for the purpose of coordinating research and development programs that will aid in the creation of new products, services and jobs in Tennessee; and*

- (scope of services #8) *Provide financial assistance through contracts, grants and loans to programs of scientific and technological research and development*.

Following are five programs TTDC management has identified as part of its strategic planning processes that it will support TSRB in evaluating and potentially recommending to the full TTDC board for implementation:

1. Phase 0 SBIR/STTR Program (active) – $100,000 authorized, Q3 FY2008

The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) program are federal programs for domestic small business concerns to engage in R&D that has the potential for commercialization. During FY 2008, TTDC approved $100,000 for "phase 0" grants – up to $4,000 of direct financial assistance for Phase I SBIR/STTR applicants in Tennessee. The goal of this program is to incentivize applications by Tennessee companies and begin tracking their success rates.

2. Technology Maturation Fund

"Valley of Death" is the ominous phrase commonly used to describe the funding gap between institution-supported basic research and investor-supported intellectual property commercialization. Many states have sponsored "proof-of-concept" or "technology maturation" grant or investment programs as a TBED strategy, recognizing that "but for" timely funding to prove risky commercialization concepts, a high potential innovation might never receive private sector investment capital.

3. Tennessee R&D Leaders Network

Pioneered by the Georgia Research Alliance, many states have developed substantially-funded TBED programs that recruit and/or retain leading scientists with strong records for commercializing innovations. Were Tennessee to engage in programs to recruit and/or retain top scientists as a TBED strategy, the first step would be to identify current residents that would qualify for such designation and to canvass for insights into current needs and opportunities within our borders. With a nominal commitment of funds, TSRB could lay the foundation for future state investments by identifying our existing R&D leaders and foster a sense of community through recognition, attentive discourse and careful consideration of consensus policy recommendations.

4. Sponsored Research Matching Funds

Similar to a side-car investment fund, TBED matching funds programs rely primarily upon external investors and/or grant awarders to assess the merits of an R&D project. Lead sources of funding for sponsored research programs include both federal agencies (NIH, NSF, DOE, DOD, NASA, etc.) and private sector companies seeking to access specialized expertise or equipment at leading research institutions. Although state matching funds never exceed 50% of the cost of a project and often comprise as little as 10% of the total costs, the absence of available matching funds can result in the loss of R&D funding that would otherwise have been secured.

5. R&D 2020 – Comprehensive Strategic Research Agenda

Nearly every year at the annual BIO convention, one or more states announce TBED programs with significant funding commitments. In 2008, Massachusetts' $1 billion for biosciences was upstaged by Maryland's $1.3 billion Bio 2020 Initiative – "the largest per capita investment in the biosciences made by any state in the country." One important lesson to learn is that the majority of states with multi-faceted program announcements (Kansas, Massachusetts, Maryland, etc.) have established TBED organizations that were actively involved in the plan development. Within the TTDC organizational framework, TSRB would be tasked with oversight of the development of a comprehensive funding strategy plan for growing Tennessee's R&D base.

The **Tennessee Capital Formation Board** (TCFB) will be formally launched in November 2008 with a base of TTDC board members and additional volunteers from many of the state's most influential risk capital investment firms and fund managers. TCFB will be positioned to advise or direct state investments that increase the supply and accessibility of risk capital investment for high-potential technology businesses.

Capital formation strategies address two market factors – supply and accessibility. Supply is measured not merely by the number of resident venture capital firms or active and sophisticated angel investor groups, but by the amount of capital under professional management that actively looks for investment opportunities in Tennessee. Accessibility issues, beyond the mere ability of inventors or entrepreneurs to get a meeting with a venture capitalist, address the sophistication of social networks that connect high potential innovations with credible risk capital investors and experienced startup technology business advisors.

The Innovation Tennessee contract requires that TTDC begin to address capital formation issues on a statewide basis:

- (Scope of services #1) *Assist in evaluating statewide innovation capacity as measured by … venture capital availability and investment…*

- (Scope of services #4) *Increase the availability of capital to perform applied research, develop technology and stimulate new technology business creation and growth in Tennessee.*

The three potential programs described below, subject to TCFB oversight and TTDC board approval, would be managed by TTDC staff and potentially involve the assistance of outside consultants for discrete tasks:

6. Tennessee Innovation Conference – November 20-21, 2008

The purpose of the Tennessee Innovation Conference is to feature 30+ high-potential innovations under development at Tennessee research institutions and to jumpstart a dialogue between scientists and venture capital investors. Presenting scientists (or their tech transfer representatives) will have 30 minutes in front of a panel of segment-experienced investors and intellectual property advisors: 7 minutes to "pitch" the innovation and commercialization strategy, 10 minutes of Q&A, and the balance of time for feedback framed as follows:

- "If you are successful commercializing this innovation, you will have done these things well…" (i.e., the critical success factors);

- "If you ultimately are not successful, it will likely be due to…" (i.e., the inherent or industry-specific risk factors); and

- "In the next year, you should focus on…" (i.e., the critical path priorities to making innovation viable for risk capital investment).

In addition to the Innovation Showcase component of the event, the Tennessee Innovation Conference will provide a public forum to educate stakeholders about TTDC's mission and strategies and to support Tennessee's competitiveness for technology-based economic development opportunities.

7. Supply and Accessibility of Risk Capital Analysis

Prior to proposing any significant state investment in capital formation programs, it is important for trusted advisors to gather credible and verifiable data demonstrating that an addressable problem exists. There are many data sources indicating that Tennessee has a capital formation challenge. For example, TTDC staff prepared the following simple analysis by pulling data from the National Science Foundation, PwC Moneytree Venture Capital Survey and the U.S. Census Bureau:

State	University R&D per capita	% of U.S. average	Venture Capital per capita	% of U.S. average
Alabama	$130.06	82.1%	$10.11	10.0%
Georgia	136.47	86.2%	49.07	48.5%
Kentucky	113.00	71.4%	32.39	32.0%
Mississippi	126.47	79.9%	3.43	3.4%
North Carolina	188.77	119.2%	65.80	65.1%
South Carolina	118.89	75.1%	19.31	19.1%
Tennessee	***120.67***	***76.2%***	***20.47***	***20.2%***
Total Southeast	**$122.58**	**77.4%**	**$34.39**	**34.0%**
California	177.64	112.2%	399.14	394.6%
Massachusetts	334.70	211.4%	560.02	553.7%
Total U.S.	**$158.35**	**100.0%**	**$101.15**	**100.0%**

Why are Tennessee venture fund managers finding more investment opportunities in technology companies outside the state? What factors give out-of-state LPs the confidence to invest in a Tennessee-based venture fund that has been far less successful in recruiting in-state LPs to invest? Are these anecdotal cases isolated or indicative of core issues that can be addressed through well-crafted state policy? Answers to these questions – gathered through a well-structured and professionally-managed survey process – could produce insights into how to address the core capital formation issues that undermine Tennessee's competitiveness in high-growth technology industries.

8. VC 2020 – Capital Formation Strategy for Tennessee

Concurrent with the comprehensive state R&D strategy and following the data collection and analysis component of the Supply and Accessibility of Risk Capital Study, TCFB would oversee the design of a comprehensive capital formation policy for the state of Tennessee and, subject to consensus within TCFB and approval by TTDC, publish it for consideration by state of Tennessee policymakers. This strategic plan would analyze programs employed with varying success by many states, including: tax credits incentivizing "informal" venture capital investment (i.e., "angel" investor tax credits); tax credits for private investment in venture capital funds; state-funded and/or state-managed venture capital funds; state investment or state-guaranteed investment in private venture capital funds (e.g., CAPCO programs); and state investment policies related to public-sector pension fund investments in venture capital funds.

The **Tennessee Entrepreneurship Network** (TEN) will be established as an operating committee of the TTDC Board to create a statewide network of entrepreneurship support systems that serve a general public interest but also identify high-potential technology entrepreneurs for customized support services. In addition to five members of the TTDC Board, TEN committee members could include the leaders of statewide small business, agricultural and manufacturing services support networks and regional economic development district leaders. In particular, TEN would likely explore partnerships with SBDCs, Manufacturing Extension Program, Cooperative Extension Program, and other support organizations with a statewide footprint.

Technology Entrepreneurship initiatives support high-growth small- and medium-sized enterprises (SMEs). Commonly referred to as "gazelles," these high-growth businesses represent only 4-8% of small businesses but account for 70% or more of net new jobs.

"Technology" entrepreneurship has a much broader application than firms working with bits and bytes, silicon and mice. Clay Christensen, author of *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, defines *technology* as "the processes by which an organization transforms labor, capital, materials and information into products and services of greater value" and *innovation* as "a change in one of these technologies."

Identifying technology entrepreneurs is not as simple as it may seem. For example, a website developer or Internet service provider can be easily mislabeled as a technology company because they use technology to provide a service; however, absent an innovative and scalable business model or a unique process that can be licensed to others, growth prospects are most likely limited. Conversely, Dell Computer was not considered a technology company by some venture capitalists because the firm merely assembled and marketed other firms' intellectual property. However, a broader application of the term would recognize Dell's business model innovations for the personal computer industry (direct marketing, build-to-order, etc.) as characteristic of a technology firm.

The Innovation Tennessee contract with ECD has the following requirements related to technology entrepreneurship:

- (scope of services #1) *Assist in evaluating statewide innovation capacity as measured by …new technology business starts…*;
- (scope of services #5) *Assist in the development of physical infrastructure required for a technology and innovation driven economy*; and
- (scope of services #6) *Stimulate entrepreneurship and create an entrepreneurial culture in Tennessee*.

9. Tennessee Innovation Capacity Grants

From time to time, organizations supporting high-growth entrepreneurship may identify infrastructure constraints that impact Tennessee's competitiveness. Subject to the availability of resources, TTDC has the ability to enter into one-time transactions to address a compelling need. These grants could be made to support equipment purchases, development of new services or other needs that support local or regional TBED initiatives that are strategic to TTDC's development plans.

10. Tennessee Mentors Network for High-Growth Entrepreneurs

Supported by TTDC staff, TEN will evaluate the cost-benefit of statewide structured mentoring programs for high-growth entrepreneurs. The purpose of a technology-enabled mentoring program is to match aspiring high-growth entrepreneurs to business advisors *with relevant technology and business development experience*. A potentially powerful application of existing platforms would be a mentoring network of Tennessee-based business advisors volunteering to advise Tennessee entrepreneurs where industry and growth-stage experience is the primary criterion for the match (rather than geographic location).

11. Local, Regional and Statewide New Innovation Competitions

An important goal for TEN is to make TTDC programs accessible to technology entrepreneurs from all walks of life and no matter where they reside in Tennessee. A network of statewide new innovation competitions would provide an effective channel for disseminating information about TTDC and receiving information about high-potential technology entrepreneurs wherever they reside.

Supported by TTDC staff, TEN will develop relationships with existing statewide organizations to implement a network of low-cost local and regional events that would be supported primarily by local sponsors, regional economic development funds and community volunteers. TTDC would subcontract development of the training curriculum.

12. Partners & Stakeholders Program Sponsorships

In recognition of the critical importance to the TTDC development plan of established organizations throughout Tennessee providing TBED services on a local or regional basis, the TTDC board created a fourth operating committee – **Tennessee TBED Partners and Stakeholders Committee** – to ensure that our development plans fully leverage the talents, capabilities and relationships of existing organizations. The primary factors for determining whether to sponsor TBED-related events with established TBED organizations in Tennessee include:

- Local or regional credibility of event organizers – Are they respected advisors to high-potential technology entrepreneurs, university researchers or risk capital investors? Will our association with the event organizers reflect well or poorly on the TTDC brand?

- Purpose of event and target audience – Does the event accomplish a task or further an objective that is consistent with the scope of services outlined in the Innovation Tennessee contract?

- Significance of TTDC participation – For a reasonable level of funding and in-kind services participation, does TTDC have an opportunity to significantly impact the success of the event?

- Potential for replication throughout Tennessee – Do event organizers recognize the statewide scope of TTDC? Are they willing to share best practices with other regions in Tennessee or do they view other regions as competitors or rivals?

TTDC ends the month of October 2008 with approximately $4.4 million of cash and equivalents available for investment. These funds include approximately $4.0 million of unearned revenue received under the terms of its active contract with the Tennessee Department of Economic & Community Development. According to the terms of this contract, revenues are earned as funds are expended towards the accomplishment of the scope of work outlined in the contract. All current TTDC expenditures are aligned with the performance requirements of our contract with ECD.

We continue to believe that these resources are sufficient to fully *demonstrate* the value proposition of coordinated strategic state investments in technology-based economic development programs. However, to ultimately fulfill the TTDC mission, we will need to leverage the results of this opportunity and earn a commitment of substantially more state and private resources over a longer period of time.

Program Commitments

TTDC board has previously approved the following program investments which TTDC management is implementing:

- TTDC entered into an agreement with the CET Life Sciences Center to purchase up to $300,000 of specialized equipment that can be used by startup biotechnology and pharmaceutical companies in Nashville – equipment for proof-of-concept research and product development that is not easily accessible. TTDC recognizes the strategic importance of supporting biotechnology entrepreneurship in one of its largest population centers.

- TTDC approved $100,000 for “phase 0” grants – up to $4,000 of direct financial assistance for Phase I SBIR/STTR applicants in Tennessee. The goal of this program is to incentivize applications by Tennessee companies and begin tracking their success rates.

- TTDC approved underwriting costs of up to $50,000 for the November 20-21, 2008 Tennessee Innovation Conference at the Doubletree Conference Center in downtown Nashville. Actual costs to TTDC are expected to be significantly less than this amount.

Forecasted Program Investments

At each quarterly board meeting through June 30, 2009, TTDC management plans to recommend funding commitments by the TTDC board for programs consistent with its development-stage operations plan. All program expenditures from these investments will have been made by June 30, 2010.

Following are the scheduled dates for future board meetings (subject to change):

- November 6, 2008 – Nashville (Belmont University)

- January 22, 2009 – Tri-Cities (Eastman and East Tennessee State University)

Appendix – TTDC Board of Directors

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Kansas Bioscience Authority strategy invests in bio growth from the lab to the marketplace[iv] ***Infusion of $52 million in research and industry expected with FY 2009 programs*** OLATHE, Kan. — With momentum building in the biosciences in Kansas, the Kansas Bioscience Authority plans to make approximately $52 million in new investments in FY 2009 to expand research; foster the formation and growth of startup businesses; and facilitate industry expansion statewide. Highlights of the KBA's programs to invest in bioscience growth throughout the business cycle include the following:	*In 2004, the 15-year, $580 million Kansas Economic Growth Act (KEGA) was passed by the Legislature based on policy research and strategy development from the Kansas Technology Enterprise Corp. $52 million is the forecasted expenditures in fiscal year 2009.*
Kansas Bioscience Eminent Scholars and Rising Stars: To enhance the national eminence of bioscience research programs at Kansas universities, the KBA has dedicated $6.75 million to recruit new eminent scholars and develop promising researchers. The scholars recognized by these programs will be standouts in their fields and bring with them existing research funding and a record of success that will translate into industry growth.	*This program was modeled after the Georgia Research Alliance. It is recruitment money to lure prolific researchers to Kansas universities. Last year, star researchers from Penn State ($5 million) and Iowa State ($2 million) were recruited to Kansas universities.*
Kansas Cancer Research and Treatment: The KBA plans to invest $5 million in collaborative projects that stimulate high-quality cancer research, treatment and care throughout Kansas.	*A strategic research initiative that leverages existing strengths – led by a former Vanderbilt cancer researcher.*
Kansas Bioscience Centers of Innovation: To further assert Kansas' international leadership in bioscience clusters such as animal health and drug delivery, the KBA plans to invest $15 million to develop novel centers of innovation to ensure Kansas bioscience industries have access to cutting-edge technology and talent to develop new products that lead to high commercial payoff and new jobs. Centers will operate as consortia of industry, higher education, and other private research organizations and will be industry-led.	*Another strategic research initiative. Kansas' animal health focus is reflective of a strong private sector research base in this niche industry.*
Kansas Venture Capital Program and the Seed and Early Stage Fund: The KBA plans to invest $4 million to expand the availability of early stage capital for bioscience startups in Kansas. The goal is to attract the attention of venture capitalists who can direct significant resources to outstanding bioscience business opportunities in Kansas, creating a pipeline of investment for privately managed funds. KBA funds will serve as leverage or match for private dollars.	*Capital formation strategies are relevant to all states outside California and Massachusetts. Kansas must play the role of VC for seed-stage investments because there are very few significant technology VC funds operating in or near Kansas.*
Heartland BioVentures: The KBA will expand its successful effort to foster the formation and growth of bioscience startups statewide. The services, resources and networks of Heartland BioVentures and its partners are directed to help bioscience startups develop products, raise capital and go to market.	*Another capital formation strategy. This initiative is focused on the facilitation of early stage companies to prepare them for VC investment.*

Governor O'Malley Announces *Maryland Bio 2020* Initiative[v] ***Establishes the Maryland Biotechnology Center, Programs and Funding Designed to Attract and Grow Biotechnology Companies in Maryland*** **ANNAPOLIS, MD (June 16, 2008)** – Governor Martin O'Malley, joined by scientists and researchers at the Johns Hopkins Institute for Cell Engineering, today unveiled a new vision for the bioscience industry in Maryland. Under the *BIO 2020* Initiative, the State of Maryland will invest $1.3 billion in Maryland's bioscience industry over the next 10 years – the largest per capita investment in the biosciences made by any state in the country – to attract and grow biotechnology companies in Maryland. "The *BIO 2020* Initiative is a comprehensive, targeted plan to leverage Maryland's science and technology assets and nationally acclaimed workforce to attract and grow the bioscience opportunities of tomorrow in Maryland," said Governor Martin O'Malley…	*Maryland's Technology Development Corporation (TEDCO) was created in 1998, the same year as TTDC. Its operations funding has been steadily increased since 2001 to more than $10 million.* *TEDCO has played an important role in aligning state interests towards a common goal – competitiveness in emerging biotechnology industries.*
Many key elements of the *BIO 2020* Initiative are based on early recommendations from the Maryland's Life Sciences Advisory Board, which began work last fall on a statewide strategic plan for Biosciences in Maryland. The Board is planning on publishing a full report later this year. The ***Maryland Bio 2020*** Initiative announced by Governor O'Malley includes:	*Tennessee has research strengths that are broader than life sciences. TTDC is working to develop the **Tennessee Strategic Research Board** as the state's trusted advisor on strategic research initiatives.*
The creation of the **"Maryland Biotechnology Center"** – a "one stop shop" to showcase and support biotechnology innovation and entrepreneurship in Maryland, and consolidate various State, academic and private sector ventures. The Center will bring together TEDCO's tech transfer initiatives, DLLR's industry regulatory functions and various UMD initiatives. Industry experts at the Center will build or expand the state's relationship with federal labs, universities, and private sector companies.	*TTDC does not envision a "consolidation" effort, but it is important to align interests across the state and in the distinct sectors of business, government and academia. States that fail to address the "Tower of Babel" challenge tend to accomplish nothing.*
Expanding and Improving Maryland's Biotech Investment Tax Credit: Under the proposal, Maryland would double its Biotech Investment Tax Credit in FY 2010 and again by 2013, a move that would leverage almost $50 million in private investment for Maryland biotech companies each year. Currently, Maryland's $6 million Biotech Investment Tax Credit is an effective and highly successful equity-building program that is usually exhausted within months of fund availability each year.	*Tennessee has a much more competitive tax structure for business. This initiative is likely intended to address its uncompetitive tax structure in an effort to not deter targeted biotech businesses from relocating to Maryland.*

Growing Maryland's Technology Incubator Network: Under Governor O'Malley's proposal, Maryland will invest $60 million over the next ten years to leverage $120 million in private and federal investment funds and grow Maryland's incubator network by 50%. A recent study found that there is a strong demand for additional space. Maryland's incubators comprise more than 453,061 square feet, create more than 14,000 jobs, and provide $104 million in state and local taxes. Additional funds would help expand existing incubators, build new incubator sites, and provide related programs to help Maryland's small technology companies take their ideas to market.	*Business incubation, based on quality professional services as well as to provide "wet lab" space for biotech companies, is an important component of effective technology-based economic development initiatives. Tennessee would be well served if this program were replicated in our state.*
Continuing to Grow Maryland's Nation-Leading Stem Cell Research Fund: The Maryland Stem Cell Research Fund was created in 2006 to promote state-funded stem cell research and cures through grants and loans to public and private entities in the State. Under the Governor's proposal, Maryland will continue to invest in life-saving stem cell research. The Governor is proposing at least $20 million annually dedicated for this purpose. During the first two years of the O'Malley-Brown administration, the State has invested $42 million in stem cell research. To date, over $36 million and 86 research applications have been funded. The Fund is the third largest state funded program in the nation.	*Another strategic research initiative reflecting existing strengths. Tennessee has similar strengths in advanced computing, pharmaceuticals and nanotechnology, as well as others that may be identified by the Tennessee Strategic Research Board..*
Increasing development funds for life science facilities: DBED has entered into a public-private partnership which will combine $1 million in State funds with $2 million in local investment. Together, this investment will leverage $100 million for building and improving life science facilities throughout Maryland.	*An infrastructure play that will be driven by the private sector and use mostly private sector funds.*
Making New Investments in Science, Research and Technology Initiatives: Initiatives for future and present support include: UMB (Health Sciences Facility III); UMB Howard Hall (Medical Research Facility); Johns Hopkins Science and Technology Park, EBDI; UMBI Center for Agricultural & Environmental Biotechnology (CAEB); Montgomery College (Germantown) Bioscience Center; and the TEDCO/Maryland Stem Cell Research Fund.	*A strategic research initiative intended to increase the competitiveness of the state's leading research institutions.*
Increasing Maryland's Technology Transfer Programs: Maryland's technology transfer and commercialization programs provide funding to small and start-up companies. The Governor's proposal includes funding to help universities and federal labs get their innovations to market, and would allow the State to significantly increase the number of start-up companies coming out of our universities and research institutions, leveraging $3.75 billion in private and federal investment.	*Similar to a technology maturation fund program under development by TTDC in partnership with the technology transfer programs of our state's leading research institutions.*
Expanding Nanotechnology Investments: Maryland is one of the leading research centers in the U.S. for Nanotechnology and, in particular, Nano/Biotechnology. By offering more grants and faculty attraction resources, the State of Maryland can leverage the vast opportunities that exist with this field, which is expected to permeate all technology industries in the years ahead. Now in its third year, the Maryland Nano/Biotechnology Initiative has provided research grants and faculty attraction resources to the University System of Maryland.	*Another targeted strategic research initiative. Tennessee is also competitive in nanotechnology research.*

Increasing Intellectual Property Valuation and Protection Services: To sustain growth of Maryland's bioscience industry, Maryland must capture every intellectual property opportunity that arises from its R&D intensive environment. Many Maryland start-ups cannot afford professional legal services for intellectual property valuation and acquisition. Under Governor O'Malley's proposal, Maryland will expand a University of MD/School of Law program to work with Maryland entrepreneurs and start-ups to validate and protect their intellectual property.	*A common and relatively inexpensive program that could be replicated in Tennessee.*
Enhancing Maryland's Venture Fund: The fund currently provides challenge grants to start-up companies and makes equity investments in more established companies. By increasing public investment by $152 million by 2019, Maryland can leverage nearly $2 billion in private equity to help these companies succeed. Through the Venture Fund, the State has already made approximately 50 investments in bioscience companies and they have leveraged 15 times the value of our investments through our network of venture capital partners.	*A capital formation strategy where Maryland makes direct equity investments in technology businesses. TTDC will look to the Tennessee Capital Formation Board to advise on similar strategies to increase the supply and accessibility of risk capital investments for high-growth Tennessee businesses.*

[i] http://www.gra.org/AboutGRA/tabid/345/Default.aspx
[ii] http://www.ktec.com/sec_about/section/ktec_07_ar.pdf
[iii] http://www.marylandtedco.org/_media/pdf/publications/AnnualReport_FY05.pdf
[iv] http://www.kansasbioauthority.org/news/Detail.aspx?id=54
[v] http://www.governor.maryland.gov/pressreleases/080616b.asp