

Innovation Potential in the Tri-Valley

A Special Report Prepared by the Innovation Tri-Valley Initiative

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Introduction

Introduction

The major purpose of the “Innovation Potential in the Tri-Valley” report is to identify and analyze the assets of the five-city California region (Danville, Dublin, Livermore, Pleasanton and San Ramon) in the context of its innovation potential. The report provides a basis for developing the innovation plan for the region. It also provides the background data and analysis for further assessment of the regions potential as an innovation hub. The research was commissioned by the steering committee of the Innovation Tri-Valley Initiative. The steering comitee conducted the research in a relatively short four-week period and prepared this report.

The report consists of six sections and they are:

1. Executive Summary;
2. Results of interviews with leaders and stakeholders in the region;
3. Demographic and economic profile of the region;
4. The tech sector, gazelles, and corporate headquarters;
5. Ecology of innovation-Tri-Valley assets;
6. Benchmark study of four innovation regions.

The preliminary assessment of the innovation Tri-Valley research team about the potential for enhancing the innovation capabilities of the Tri-Valley region is positive as many valuable assets are already in place. Undoubtedly the quality and size of some of the assets need to be enhanced. The challenge is to provide more effective interconnections among the various elements (assets) of the Valley’s innovation ecosystem. In addition, being adjacent to Silicon Valley creates both a large shadow to live up to, and more importantly provides vast resources and talent that should all be considered valuable assets to leverage in the Tri-Valley. This issue is discussed in some detail in the report.

The key success factors identified in the benchmark study involving four US innovation hubs are important to remember as the region continues to move forward. They include:

- The involvement and continued support of visionary public and private sector leaders who are dedicated to fostering the sustainable growth of the region’s innovation economy.
- The development of well-planned, well-financed and well-executed public-private sector initiatives (e.g. incubators, seed funds, workforce development, networking events) to foster the growth of the region’s existing and emerging high-tech industry clusters.
- The presence of at least one research-oriented university and/or several high-caliber research agencies or institutes that understand and support technology transfer to the private sector.
- A high quality of life that includes a reasonably affordable cost of housing, a decent transportation system, ample recreational opportunities, and active arts and culture communities.

Executive Summary

Executive Summary

Interview Highlights

As a part of the initial research for the Innovation Tri-Valley effort, a set of (10) leadership interviews was conducted to identify elements of a common vision, determine areas of alignment on opportunities and challenges and identify key leadership needs to make this effort successful.

- Most respondents felt that there are already highly valuable assets in the region, good success stories, and strong communities, but that they are not interconnected or fully leveraged.
- The most critical success factor mentioned most often across the interviews was the need to “continue to lead this [initiative] with senior executives and visionaries and keep them involved.”
- There was a strong sense that this effort is starting at the right level of leadership and needs to continue to bring top leaders into alignment around a common vision.
- It was recognized by most people interviewed that there is a real need to maintain the unique personalities and visions of each city, yet find a way to develop a vision that can serve as a common center and rally point.
- Another challenge for the region was mentioned frequently in the interviews relating to the fact that a high percentage of entrepreneurs and employees of the top industry sectors in the Tri-Valley (e.g., clean-tech, software/IT) come from other countries. There was recognition by major employers that to continue to attract the best global talent Tri-Valley communities, while open, will need to stretch even further to embrace other cultures.
- The top two immediate actions raised most frequently by the group involve the need to a) create an atmosphere where start-ups can be supported, technology transfer occurs more easily, and research universities collaborate more closely with industry, and b) develop a regional identity that captures this essence.

Profile of the Valley: Demographics, Income, Employment

- Between 2000 and 2008 the population of the Tri-Valley region comprising the cities of Danville, San Ramon, Dublin, Pleasanton, and Livermore grew by 19% compared to only 10% for the US. In the same period the fastest growing cities in the region were Dublin (49%) and San Ramon (40%).
- Jobs are in abundance in the Tri-Valley region, with an impressive ratio of companies to residents.
- Residents of the five municipalities tend to be older than the national average, with the exception of Dublin, which has an average age of nearly three years younger than the national average.
- Tri-Valley residents also tend to be much more highly educated than the national average, with the exception of San Ramon, which has approximately the same percentage of degree holders as the national average. Pleasanton and Danville are particularly impressive, with over 50% of residents holding a higher education degree.
- The median income of four out of the five Tri-Valley cities is more than double that of the United States as a whole. Only Livermore lags in terms of median income, but not by much. This is not surprising as the Tri-Valley cities possess higher levels of education than the national average.
- Located in one of the most vibrant economies of the United States, over time the Tri-Valley region has enjoyed consistently low unemployment and high median income.
- Tri-Valley compares favorably with the Silicon Valley benchmark cities of Palo Alto and Mountain View. In terms of unemployment, Palo Alto trends somewhat lower than most, but overall resides within the same range as Tri-Valley. In terms of median income, Danville, Pleasanton and San Ramon have all kept pace with Palo Alto over the last two decades, and Mountain View has actually trailed the Tri-Valley consistently in this category.
- In the areas of age, education and median income, the Tri-Valley region compares favorably with the Silicon Valley benchmark cities of Palo Alto and Mountain View. Danville is nearly identical to Palo Alto from a numbers standpoint in these three categories. The only area of significant disparity appears to be in education, with Palo Alto boasting an impressive 78% level of degree holders.

Profile of the Valley: The Tech-sector, Fast Growing Start-up Companies & Corporate Headquarters

- There are currently 765 tech companies operating in the Tri-Valley region, indicative of a healthy and welcoming business environment for the industry as a whole.
- Companies with 1-4 employees comprise 54% of the total, 5-99 employees: 41%, 100-499 employees: 2.8%, and 500 plus: 2.3%.
- Two industry clusters dominate the tech sector in the Tri-Valley high-tech scene— Software and Cleantech. Biotech and Communications also have a respectable presence in the region.
- The Tri-Valley region possesses a healthy share of Gazelle (fast growing) companies. In 2007 seven Tri-Valley companies made the Inc. 500 list. Moreover, in 2007-8 the Valley had 30 companies in the composite Inc. 500/5000 list. It is important to note that most Inc. 500 and Inc. 5000 Gazelles were located in the cities of Dublin and Pleasanton.
- Eleven of the East Bay's top 50 companies are headquartered in Tri-Valley, including Chevron, Safeway, Ross Stores, and Sybase are located in Tri-Valley. In addition, three of these companies are also top 20 in the Bay Area.
- With the notable exception of Chevron most of these corporate headquarters, six out of the eleven, are located in Pleasanton.

Ecology of Innovation –Tri-Valley Assets

Element #1 – Sources of Research, Ideas, Innovations, Tech Transfer

The presence of nearby world-class research universities and laboratories including the University of California (UC) at Berkeley, Stanford University, Lawrence Livermore National Laboratory, Sandia Laboratory, and UC San Francisco, along with Chevron's headquarters in San Ramon, is beginning to form the foundation of a sustainable innovation economy in many ways. These institutions generate and license intellectual property; link faculty with businesses as consultants and advisers; support faculty in the commercialization of their innovations; provide the private sector with a steady supply of talented engineers, designers, managers, etc.; provide innovators with access to cutting edge laboratories and equipment; and encourage a continuous dialogue among industry experts, faculty and students and the business community at large.

While easy access to the myriad resources of the Bay Area and the Silicon Valley has been a key factor in the Tri-Valley's success and will continue to be an important factor in its future as an innovation hub, convenient local access to higher education and university research facilities is one area in which the Tri-Valley needs to improve to become a more viable center of innovation. Facilities such as Las Positas College and the Diablo Valley College San Ramon Valley Campus are making a positive contribution, along with the numerous private university MBA and graduate programs available in the region. Still, an expansion of Las Positas or the establishment of a satellite campus of a major university in the Tri-Valley would help drive new research and more tech transfer.

Element #2 – Entrepreneurs

In the innovation ecosystem, the entrepreneur is the biological host. Without the unique talents, traits and tenacity of the entrepreneur, bold new ideas would never see the light of day. We all have lots of new ideas, but the entrepreneur, driven by the energy and excitement of the core idea that is the seed of innovation, as well as by a hefty dose of self-interest and visions of personal gain, makes the commitment and takes the risk to manifest the innovation as a new product or service. A culture of entrepreneurialism is a key feature of a highly developed innovation ecosystem. The Tri-Valley region has an array of entrepreneurs, ranging from iconic figures such as David Duffield and Ken Behring to the scores of founders of startups such as FunMobility, Reply.com and TRIA Beauty.

Element #3 – Investment Capital

Very few ventures can launch and grow to become world-class companies without large infusions of cash at crucial stages in their development. Tri-Valley has convenient access to high net-worth individuals (angel investors) and billion-dollar VC firms in Silicon Valley and the Bay Area. Organizations such as the Keiretsu Forum, the notable global angel network originally established in the Tri-Valley region, play key roles in linking start-ups with seed and early stage funders. However, Tri-Valley's investment pull extends far beyond the Bay Area - venture capital flows into the region's start-ups from such far-flung locations as New York, Toronto and London.

Element #4 – Workforce

No business venture can thrive without a skilled and dedicated workforce. The Tri-Valley region is becoming a magnet for talent from all over the world, and the growing diversity of the region's workforce is becoming a source of its strength and success. More so even than the social environment, the region's business environment provides a melting pot of people and ideas from a wide range of ethnic backgrounds, academic disciplines, business cultures, etc. At the same time, as in every ecosystem, organisms (i.e., skilled workers) at every level are opportunistic. In a culture where job-hopping is an accepted practice, retaining talented employees is challenging for every company. As the skills gap in the US workforce is a major concern, greater focus is necessary in the region on attracting and retaining the best and brightest workers. Retraining will continue to be a major issue for business success in the region.

The region's workforce fed by major educational institutions. As a result, the percentage of college degree-holders is far higher in the Tri-Valley than in the nation as a whole. Yet as the skills gap in the US workforce widens, greater effort must be made to attract and retain the best and brightest workers. Retraining will continue to be a major issue for business success in the region.

Tri-Valley has historically been a very ethnically homogenous region. This is changing and change will positively effect the region's innovation potential. For one thing, the number of Asians living the area has more than doubled over the last decade. Statistically speaking, Asians tend to be better-educated and more active in technology, engineering and science. Not only are more native-born Asians moving to the area, so are more foreign-born individuals, whose numbers have increased at nearly the same rate. In the Silicon Valley immigrants have been responsible for more than half of all startups over the last decade.

Element #5 – Social & Professional Networks

Just as money is the key fuel for innovative ventures, information is vital for survival and success, particularly when competing on a global scale. Information takes many forms and comes from myriad sources, including both formal and informal social and professional networks. Information, ideas, contacts and connections flow freely despite the competitive spirit that pervades in the region. The degree to which the region's business community has successfully managed the tension between collegiality and competitiveness has proven to be a major contributor to the healthy business environment.

In the Tri-Valley, a number of organizations play a prominent role in building the collegiality and information transfer necessary to growing innovation. The East Bay Economic Development Alliance and Tri-Valley Business Council are two of the most prominent public/private partnerships that work to unite the divergent voices of government, private industry and residents. The local chambers of commerce are also quite active, providing valuable resources and connecting businesses with new opportunities. The East Bay Innovation Group (EBig) has been an important source of professional development and networking opportunities for the region's tech entrepreneurs and IT professionals.

Element # 6 – Business Environment

Every ecosystem is dependent on the surrounding environment. That environment may be nurturing and supportive of vitality and growth, or it can be a source of stress and hinder or even threaten the long-term viability of the organisms within it. The same is true in an economic ecosystem. A region's economic environment includes many complex and interdependent factors: its social framework and political structure, its physical and economic infrastructures, its population profile, etc. In these ways and more, the Tri Valley has a healthy business environment for innovation.

Leading the way in supporting a healthy environment are the Livermore Valley Open Campus (LVOC) development and the iGATE program. LVOC will create a common area for collaboration among government and private sector scientists and engineers to solve challenges in transportation, energy and other sectors, while iGATE is one of the state's six approved iHub programs and will bring together educational institutions and private enterprises to drive innovation in green transportation and clean energy technologies.

The region's business environment is also fortified by the nearby presence of leading professional services organizations, including world-class accounting, law and consulting firms, as well as by business-friendly government policies such as tax breaks, subsidies, low business license fees and outreach programs.

Element # 7 – Quality of Life

The overall quality of life of the Tri Valley and the larger Bay Area is a significant contributor to the region's economic success. With its Mediterranean climate, scenic beauty, first-rate cultural venues, cosmopolitan ambiance and proximity to sun, surf and mountains, the Tri Valley region can easily qualify as one of the more attractive regions in the United States. While quality of life may not seem the most important element of an innovation ecosystem, we believe that Tri Valley's locale has played a major role in its birth, evolution and success.

The Tri-Valley region enjoys a location at the center of a number of key regional areas: San Francisco and Oakland, San Jose, Stockton and Napa, and is accessible by a variety of transport options. It has a moderate, Mediterranean-style climate that combines with rolling green hills to provide an idyllic setting for enjoying the region's bountiful recreational activities: golf, wine, food, outdoor adventure, historic downtowns and cultural events. Life in the region is supported by stable and well-managed water and utilities services, award-winning public schools, safe communities and available health care. The one major drawback appears to be the persistent lack of affordable housing, although there are signs of improvements in this area.

Summary of Success Factors – Benchmarking Study

Austin, TX

As the capital of Texas, Austin has been able to build its innovation economy on a strong public sector foundation. With numerous government agencies that provided a stable base of employment, the University of Texas at Austin with its deep involvement in academic research, and a rich history of music and culture, the region was able to attract several pioneering companies in growth industries (e.g. electronics manufacturing) that spawned numerous spin-offs.

On this foundation, business and community leaders recognized the need and opportunity to support the emergence of the region's high tech economy. They did so by identifying and supporting economic development initiatives targeting the region's emerging tech industry clusters with strategic initiatives developed and based on a win-win vision for both the region and the stakeholders. Two factors contributed to the success of these initiatives. The first was the willingness to retain outside expertise to make an objective assessment of the region's weaknesses as well as its strengths. The second was the willingness to commit sufficient funds and resources to implement these initiatives over a sustained period of time.

Through these initiatives and parallel efforts, the region was able to create a rich and diverse ecosystem of support systems for entrepreneurs and start-up companies with numerous interlinked business and professional networks sharing a commitment to the region's economic prosperity.

Nashville, TN

With a major research university as the hub of the region's economy and an international reputation for its culture of music and entertainment, Nashville was selected as home for several very successful healthcare services companies whose founders and executive leaders shared a commitment to innovation and a spirit of entrepreneurship. Several well-orchestrated initiatives were launched to capitalize on and aggressively promote Nashville's strong suit, healthcare services, via a well-managed non-profit business association. The region's culture of innovation and entrepreneurship was encouraged and nurtured over the years as a key economic development strategy to build on the region's historical successes and established core industry strengths.

Research Triangle Region, NC

North Carolina's Research Triangle Region grew from a deliberate and well-executed plan to build an innovation economy created by a small group of visionary leaders with complementary backgrounds, abilities and resources. A single well-financed organization was empowered to manifest the vision of a high-tech development project: the Research Triangle Park. The Park was successful in attracting several large anchor tenants, both public and private sector, with complementary specialties (e.g. biotechnology), synergistic relationships and global operations. This created the momentum that contributed to the success of subsequent strategies designed to support the formation of new companies and access to capital, expertise and specialized equipment to help them grow. The success of the Park rippled out into the surrounding region via coordinated public-private efforts to develop and support the region's tech economy by nurturing and promoting existing and emerging business technology clusters.

San Diego, CA

San Diego was blessed with a high quality of life that contributed to its success as an innovation hub. As an active port for military and commercial shipping and a popular port of call for global tourists, San Diego had a thriving economy upon which to build its innovation ecosystem. With UC San Diego as the center of a constellation of world-class research institutes and research centers, the region became a hub of innovation and home of numerous technology start-ups. The region's business and civic leaders recognized and capitalized on core technology clusters and emerging clusters that evolved naturally from the region's economy. Through intentional and focused initiatives and efforts, San Diego has now embraced the cleantech revolution and recognized the opportunity to leverage the region's assets to stimulate a new cleantech sector.

Common Traits of the Benchmark Regions

The four regions profiled above share several common traits. These include:

- The presence of at least two successful companies in similar fields that create a culture of expertise in one or more core fields (e.g. electronics manufacturing, health services) that served as the seed of one or more industry clusters.
- The presence of at least one progressive research-oriented university and/or several high-caliber research agencies or institutes that understand and support technology transfer to the private sector.
- Visionary public and private sector leaders who are willing to transcend politics and self-interests to foster the growth the region's innovation economy.
- Well-planned, well-financed and well-executed public-private sector initiatives (e.g. incubators, seed funds, business associations, networking events) to foster the growth of the region's existing and emerging high-tech industry clusters.
- Active business and professional organizations led by committed business and civic leaders who share a common vision of the region's long-term success.
- A high quality of life that includes a reasonably affordable cost of housing, decent transportation systems, ample recreational opportunities, and active arts and culture communities.
- Aggressive and on-going branding and marketing to build and maintain the region's image and reputation as an innovation economy and desirable place to start and grow a business.

Interview Highlights

Interview Highlights

As a part of the initial research for the Innovation Tri-Valley effort, a set of (10) leadership interviews was conducted to identify elements of a common vision, determine areas of alignment on opportunities and challenges as well as identify key leadership needs to make this effort successful. This group included top executives and leaders of a diverse range of stakeholders including, major global corporations, mid-sized business, education, food & beverage, civic organizations, cities, counties, National Labs and non-profits.

In addition to formal interviews, there were several in-depth informational interviews conducted with business and community leaders, which helped inform the rest of the content in this report. A list of these individuals can be found on pages 103 and 104.

Overall Opportunity and Challenge

When asked about the magnitude of change required to achieve the vision of becoming an innovation hub as a region, most respondents felt that there are already highly valuable assets in the region, good success stories, and strong communities, but that they are not interconnected or fully leveraged. The following quote captures the overall essence of the typical response: “The raw elements are in place and it’s more about how to bring those into production.” A closer review of the profile data collected and assets identified through the interviews reveals a picture that the Tri-Valley, already possesses most of the elements for a highly successful innovation region that can be leveraged to much greater impact together.

The most critical success factor mentioned most often across the interviews was the need to “continue to lead this with senior executives and visionaries and keep them involved.” There was a perspective that other recent efforts to work more collaboratively across the Tri-Valley had gone unfulfilled or didn’t have a large impact due to a lack of senior leadership involvement in the efforts. There was a strong sense that this effort is starting at the right level of leadership and needs to continue to bring top leaders into alignment around a common vision.

In addition, there was a common concern that the cities in the region have had a history of competing with each other. It was pointed out that businesses view the region as a whole. It is a place to establish a physical presence perhaps on one city, but that the Tri-Valley area overall is where a diverse group of employees can find a great place to live, work, raise their families and find a wide range of activities, entertainment and shopping, in unique cities and neighborhoods that meet their needs.

It was recognized by most people interviewed that there is a real need to maintain the unique personalities and visions for each city, yet find a way to develop a vision that can serve as a common center and rally point. It was suggested that the Innovation Tri-Valley effort should address the issue that “there is no real community center, which creates more competition than cooperation.” This quote and others were in recognition that this would likely not be a geographic “community center”, but more of a shared vision and clear set of mutual goals and initiatives.

Another challenge for the region was mentioned frequently in the interviews and relates to the fact that a high percentage of entrepreneurs and employees of the top industry sectors in the Tri-Valley (e.g., cleantech, software/IT) come from other countries. There was a recognition by major employers that to continue to attract the best global talent that our communities, while open, will need to even stretch further to embrace other cultures. The following quote captures the essence of the sentiment of the leaders interviewed overall: “Changing the culture will require us welcoming a diverse culture...”

A call for a clear message, focused commitment to follow through and well aligned leadership team was captured in the following quotes about the effort:

“Vision on how to articulate the message”

“Focus, concentration, commitment to keep the momentum going.”

“Hope this effort will galvanize the group”

“I think there is a lot of will to lead and desire. There is openness and talent.”

The top two immediate actions raised most frequently by the group were around the need to create an atmosphere where start-ups can be supported, technology transfer occurs more easily, research universities can collaborate with industry and we develop a regional identity that captures that essence.

“Incubator” / “Open Campus”

“Solve the branding problem...”

List of Interviewees

Jill Bergman	Econ. Dev. Coordinator, City of Danville
Marty Beard	President, Sybase 365
Toby Brink	Executive Director, Tri-Valley Business Council
Joseph Caggiano	Senior Consultant, Chevron Energy Technology Company
Jay Davis	President, Hertz Foundation
John Dulchinos	CEO, Adept Technology
Marc Fontes	Director, Economic Development Dept., San Ramon
Scott Haggerty	County Supervisor, Alameda County Board of Supervisors
Randy Hawks	Managing Director, Claremont Creek Ventures
Susan Houghton	Director, Pub. & Govt. Affairs, Safeway, Inc.
Dale Kaye	President and CEO, Livermore Chamber of Commerce
David Kent	CEO, The Wine Group, Inc.
Sue Carlson Lim	Director, Human Resources, Adept Technology
Linda Maurer	Economic Development, City of Dublin
Ken Mintz	Area Manager, External Affairs, AT&T
Pam Ott	Econ. Dev. Director, City of Pleasanton
DeRionne Pollard	President, Las Positas College
Erik Stenehjem	Director, IPO, Lawrence Livermore National Laboratory
Stan Swete	Chief Technology Officer, Workday, Inc.
Phil Wentz	Vice Chairman, Wentz Vineyards
Rob White	Econ. Dev. Director, City of Livermore

Interview Compilation

PART 1 - Overall Assessment of Readiness

1A. How would you describe the overall magnitude of change to realize the vision of the Tri-Valley becoming a true global innovation center?

“The raw elements are in place and it's more about how to bring those into production.”

“May be larger than participants realize. It's very large. Obstacles are not small.”

“We need commitment to participate, a way to bring all initiatives together to spark regional cooperation.”

“It's on the right path, needs acceleration.”

“Tri Valley has 75% of the assets in place, we now need to brand the effort together and attract business clusters to the region.”

“The magnitude on how we think about ourselves is great, but getting it done is medium...”

“Significant in both breadth and dept, with a need to define innovation: what and when, and the how's and why's in this process. Cultivating the culture will be critical.”

“We are much closer that people think. If we can connect the dots and create interconnectivity, and if we can tell a single story, we already have some amazing resources.”

“Significant. This will take a lot of leadership up front, the culture, cohesion, collaboration, ability to welcome a diverse population, infrastructure...all of these will change over time. It will feel like smaller changes since it won't all be done together, but overall it is very large.”

“We need an attitude change to have an unique identity, separate from Silicon Valley. Big change but not monumental.”

1B. What are the three most important changes or improvements to be successful in reaching our vision?

“Continue to lead this with senior executives and visionaries and keep them involved.”

“Cities need a vision of regional success, working together...”

“Need a coherence and critical mass of focus...”

“Getting business leaders involved and a critical mass and passion for understanding the benefit of having a cohesive plan.”

“Understanding who we are and who we want to entice to come to the region and participate.”

“Getting the right decision makers who can really drive the process. Marty beard has started a great effort.”

“I580 transportation issues need to be fixed.”

“Company presidents of organizations with revenue over \$1 billion need to step up to lead this effort.”

“Vision needs to go beyond tech.”

“Regional collaboration, not in silos. Cities need to shift focus from retail to branding the region, together.”

“We need a mindset change, move from agriculture to technology. And need to look for funding under a collective agreement.”

“Labs should be more open to support a private public partnership.”

“Self perception on how we thinking about our region and yet how special each area is as well.”

“Interconnect more holistically and brand ourselves collectively.”

“Practical management structure to make decisions and to fund these efforts.”

“Get to a clear definition and identity that unites our cities. Recognize and acknowledge our regional power, and need one source to step-up and lead.”

“Access: Ongoing challenge to keep this in front of us, and include our commitment to the community, social justice.”

“Infrastructure that facilitates our communication (newspapers are local effort) Where does one go for information? It is mostly word of mouth, who you know. Need to define our identity and unify our communication.”

“Cities need a vision of regional success, working together, not individual success.”

“Two labs need to be full partners, they have a role to play, can't be passive.”

“Look at urban limit. Our development restrictions on regional land use are very tight.”

“Need a single entity to bring a vision of regionalism together. We've been successful in lobbying Washington together, but not necessarily in pulling together the true players in business innovation across the region.”

“Create a narrative - branding - a real story about the value we have, the resources we have already that we can to attract the right people - investors, entrepreneurs.”

“Continue to lead this with senior executives and visionaries and keep them involved by making sure that the effort is beneficial overall to the companies leading the effort.”

“Need a coherence and critical mass of focus on education, funding, talent pool, etc.”

“Build a track record of success stories over time.”

“Leadership: Single-minded focus by a leader to make this happen, with a full-time focus.”

“Performance: Need to change the culture and way-of-life in this community. We have very little interaction between many of the businesses in the community. And we are going to need to create an early win as a group.”

“Branding: we need something we can "show" to people as a track record of success.”

“Better education base, a university connection. This will also bring youth , diversity to the area. Other models have shown that having a University near by is key (Austin, Boston).”

“Make this area a destination for business.”

1C. What are the three most difficult obstacles?

“Changing the culture will require us welcoming a diverse culture...”

“There is no real community at the center, which creates more competition than cooperation.”

“There is protectionism at a city level.”

“Protecting the personalities of each city, plan for development, open space and the balance. Pitfall: don't homogenize the region. We need to understand what we have in order to plan for the next 10, 20 years.”

“Cities are interested in the process, but we need to readdress what has already been started.”

“Tri-Valley is located inside California, which is failing.”

“The Cities and Counties don't always get along.”

“Competition from other innovations centers in Norcal/Pac NorthWest, Mountain West.”

“Lack of focus, too many things, across too many areas, across too many people....”

“It will be a problem if we can't figure out how to create something real about how we interconnect.”

“Funding and also strong and consistent leadership.”

“Our inflated egos as leaders to know we have a lot of room to improve.”

“Lack of uniting binding between us.”

“Time of the leaders, resources for a major branding, marketing, communications campaign. Lack of cohesion.”

“Infrastructure obstacles: Freeway congestion, no FedEx, small airport.”

“Housing is likely still an obstacle because of price.”

“Protectionism at a city level.”

“This may not be an obstacle, but do we have the right cultural sensitivity to embrace diversity that we want for innovation.”

“We don't have a proficient educational system. We don't necessarily need a top tier research university as we will get that talent on a global basis. What we do need is a strong junior college or university to develop skilled technicians and undergraduate to possibly masters level engineers.”

“Quality of life. We need to manage traffic and also to build more cultural diversity. This is not necessarily ethnic diversity, but more that we need to develop an international connectivity in the region.”

“We have insular local government policies. We need more non-parochial collaboration between the various cities and localities.”

“Putting together the infrastructure of innovation. We need investment capital, entrepreneurial skill, inventions/ideas, and markets.”

“Changing the culture will require us welcoming a diverse culture, will need to learn to move much faster and will need to take on an increased enthusiasm for risk taking.”

“Need to enlist and support cohesion of the senior leadership within the Tri-Valley.”

“To attract business, we need cooperation between cities, need a more cohesive effort from all, together.”

“Image of rural more than high-tech”

1D. What kinds of help do you and other leaders need to successfully lead this effort?

“Focus, concentration, commitment to keep the momentum going.”

“Vision on how to articulate the message.”

“Full time staff to recruit and maintain a membership. Need a Director who will connect with important people who will fund the effort. Volunteerism will only go so far.”

“Re-focused Tri-Valley Business Council.”

“Consensus, collective thinking, deadlines to make decisions involving key stakeholders , with Chambers and cities helping on initiatives where they have traction.”

“Need a coalescing plan that we can work with.”

“Need help staying on task. Having an identity will help unite the effort.”

“We need buy-in by a full set of stakeholders - government, civic organizations, businesses. We need to get everyone embracing the concept of innovation as driving success...like Giuliani getting New Yorkers to embrace ‘politeness’.”

“We need media presence and attention with major national media about this innovation region. We also need policy makers to support this effort and perhaps a major foundation to create a forum for our work.”

“People who have successfully done this before. Learn from others who have results to show for this. Also, we need near-term successes to start as a core.”

“Clear Vision of what we are trying to create. People want to be part of something bigger than themselves. Build this effort at the grass-roots level. Branding the initiative to support the vision. Create a value proposition to attract new business and community leaders.”

PART 2 - Preliminary Ecology of Innovation Diagnosis

What are the top 3 assets to leverage in each area? What is the single biggest gap in each area?

2A. Research (R&D)

“Assets: Labs and multiple companies.”

“Gap: Labs are great, but don't spawn entrepreneurship.”

“Labs and research clusters near the Labs. Sybase and others may have research facilities available, but how does that get communicated?”

“National Labs, global companies, Stanford & Cal. The Gap: Transportation between the Tri-Valley and Stanford & Cal.”

“Labs. Gap: Labs are not Stanford or UC, different dynamic is not as inclusive.”

“National Labs (but how to leverage), LLNL/company exploration on large scale data management, 1,000 developers and R&D talent at our company, deep mobility experience.”

“Labs; Sybase Gap: Connection with a 4 year educational institution.”

“1) Labs 2) Kaiser Research Center, Pleasanton 3) individual researchers in the region Gaps: How to find research talent? How to handle IP quickly.”

“Labs, Ultracell.”

“Key assets are LLNL/Sandia, Berkeley/Stanford, Energy companies, IT companies. However, as a gap we lack suitable lab space and manufacturing space for cleantech/biotech products - even just to do prototypes in some areas. We are more geared towards IT or professional services.”

“Assets: National labs, Keiretsu Forum, Las Positas CC. Gap: could build open campus joint effort with a major research university (MIT, Carnegie Mellon).”

“Labs; Chevron; Strong software capabilities (Sybase, PeopleSoft). Gap: University, not many R&D centers here; Labs are great but don't spawn entrepreneurship.”

2B. Entrepreneurs

“Assets: *Fragmented set of individuals and some connections to educational institutions.*”

“Gaps: *This is not a place for entrepreneurs to start. No compelling reasons to specifically fund companies here versus Silicon Valley.*”

“Wente fosters new wine makers, UC Davis has branch at the Labs, Lab infrastructure is already built.”

“John Chen, Sybase. The urban winemakers. This short list is obviously a gap.”

“Dave Duffield, Wente Vineyards, Joe Callahan, Sentinels of Freedom, Mike Conquin.”

“Have heard about Keiretsu Forum, but with some mixed input.”

“Sybase; The Wine Group; Kaiser (industry leader that innovated health care by addressing preventive care and are thoughtful about the way they spend their budget.)”

“Have many who could teach programs in entrepreneurship. Open Campus should be open to the public. University of Phoenix. Gaps: need better management and focus on patents to support tech transfer; identify and fast-track the right ones.”

“There is a pocket of new businesses around the labs where Ultracell is located.”

“I'm not that involved with entrepreneurs to name them, but I do know that there are many in the area.”

“Assets: Bay Area Universities have great programs for Ph.D.'s and technical degrees to earn entrepreneurial certificates, good commercial real estate rates and between developments and the

labs we have high quality office, manufacturing and lab space, Bay Area successful entrepreneurs looking for the next-best thing.”

“BART accessible, an SF link; affordable housing; reverse commute. San Ramon Civic Center needs to be developed.”

2C. Investment Capital

“There are some VCs with a focus out here. And there are some cash-rich companies that could invest here, but would need to see a greater growth of the right types of start-up companies.”

“Sigma Partners, Claremont Creek Ventures, Robert Pincus in Emeryville, Rand Keiretsu Challenge is how to bring Silicon Valley investors to the area.”

“John Madden Gap: Labs, having a large amount of patents per year, could help push them to market faster.”

“This area is not a gap and we have plenty of access to capital.”

“I’m not worried about capital. My job is to start new businesses and capital is not an issue. The government is more than willing to provide money, with no equity necessary. Federal and state governments both. Also, Keiretsu Forum is right here. VC (X/Seed Capital, Foundation Capital, Cascade Capital, Battelle Ventures).”

“Silicon Valley has become a ‘big bet’ only place. We could be more of an incubator area where people get the attention they would not get in Silicon Valley. Labs, Chevron could help; Labs could become a vehicle to help funnel government funding to local companies. Gap: no strong foundation of investment capital.”

2D. Workforce

“Assets: Diverse and highly qualified workforce. Proximity to Berkeley and Stanford.”

“Gaps: We may need better collaboration between businesses and local colleges for training the right skills for our companies. We donate major funds to other universities, but only small amounts locally...”

“Smaller firms and service providers are the majority workforce. We have a highly educated population in the region.”

“Labs; Las Positas College; Safeway; Kaiser Gap: Large companies that are disconnected from the community; work here and then leave.”

“Can recruit from Labs; Proximity to Berkeley and Stanford; Great place to raise a family; Las Positas to train workforce in IT and other technical skills.”

“The community college is a starting point, but we may need better collaboration between businesses and local colleges for training the right skills for our companies. We donate major funds to other universities, but only small amounts locally in the region.”

“Diverse and highly qualified workforce - we have Stanford, Berkeley, St. Mary's, Santa Clara, and others that are very good schools that are so close to the Tri-Valley. Las Positas is available to provide a technical workforce. Together, that is a powerful combination.”

“Access (East Bay, Silicon Valley, SF) Gap: without a University we lack the steady influx of young new talent.”

“Tracy, Stockton, locals. Gap: affordable housing in the Tri-Valley.”

“We recruit from Stanford and Berkeley, we have held local job fairs with some success. And, we've leveraged Stanford and Berkeley campuses to train our employees. We are seeing that more people are living and working in the Tri-Valley, which makes recruiting easier.”

2E. Business Services and Professional Networks

“Gaps: Need much more connecting opportunities with professional networks. Most people go to Silicon Valley or San Francisco for professional networking.”

“Chambers provide a good forum for smaller businesses.”

“Livermore Chamber of Commerce. Winegrowers Association.”

“We work with many local service providers across many services. Things like serious IP litigation we would likely go to San Francisco. There is an opportunity to get professional networks in place here.”

“Livermore Chamber (great connector); Association of Wineries. Gap: need much more connecting opportunities with professional networks. International students should bring more diversity to the area.”

“CEO Alliance. Gap: Most networks are in SF, Silicon Valley, companies need to go out of the area for professional services.”

“We have many corporate networks, but we don't necessarily open those to the outside community. When we do, those are more just volunteer efforts (Earth Day, etc.). We do have a tutoring program where employees go into the schools to help.”

“We have good regional business services firms, but will quickly attract top tier firms as we succeed. In terms of Professional Networks, I belong to MIT/Stanford forum on Entrepreneurship (VLAB), ACG (Association for Corporate Growth).”

2F. Quality of Life

“Assets: This is overall a strength.”

“Gaps: Public schools have uneven development. It doesn't have the cache of being a hot technology area for young people. For immigrants it can be hard to find a way into the community. It's friendly, not sure how welcoming.”

“Best place to live in America, great performance arts center, great recreation.”

“Wine country vs. sprawl. Mediterranean climate. Proximity to San Francisco.”

Long list, this is a great area, makes it appealing.”

“Huge advantage for young families. Generally an advantage. Not as expensive, diversity is growth. If you're young and single, you may not pick this area...but would rather be in SF, Berkeley.”

“College and arts programs; senior programs; parks and recreation; cultural arts venues; restaurants; public schools; general sense of wellbeing.”

“This is high point: wonderful place to raise a family, wine country access to Tahoe and the ocean, also great medical care.”

“This is overall a strength. Just need to make sure educational systems are strong. We do have a dynamic that is like the big cities emptying out after the workday. People don't stay in the area, so therefore there is not as much networking.”

“Great transportation, education system, entertainment. May need more expansion of leisure activities - more restaurants, gyms, golf courses.”

“Mt, Diablo; Diversity; Winery, golf; Access to SF, Tahoe, a gateway; outdoor activities; Industry and community are well integrated. Space!”

PART 3 - Leadership

3A. How would you describe the current functioning of key leaders across the Tri-Valley as a group (e.g., business, political, community, education)?

“Hope this effort will galvanize the group. Key Players are needed, including CEOs and founders of major companies in the region.”

“Uncoordinated.”

“Industry needs to be the early adopters, cities and government is risk-averse and may stall the process, but will follow if we have a cohesive plan.”

“I think there is a lot of will to lead and desire. There is openness and talent.”

“Leadership group is polite; knowledgeable about each other, function on an as-need basis; not sure how to truly help each other.”

“Business leaders are raising money for the theatre. Lab leaders are inadequate for this new era.”

“Not sure, haven't been involved enough.”

“The group operates better than most for regional and local.”

“This is an opportunity for improvement to communizing purpose and goal.”

3B. What specific changes need to be made in order to achieve the regional vision?

“Branding and communication, and a plan of how far we want to take this project.”

“Better coordination, shared vision, tangible mission.”

“United effort, inclusive.”

“We need to just make sure to maintain momentum, not get fragmented and stick through to create the plan. Eventually, one or two people need to emerge as ongoing leaders of the effort.”

“Acknowledge ourselves as the leaders of this region. Be deliberate, own the success and failures.”

“Accept that we need a regional vision, and act on it.”

“Not sure, haven't been involved enough.”

“We will need to have a leader with demonstrated success. Needs to have the right charisma and drive to pull this together.”

“Get individual towns to work together on a common vision, not a zero-sum game.”

3C. What do key leaders need from the Innovation Tri-Valley Steering Team in order to succeed?

“Very compelling business model...captures the imagination of everyone, because there is something with everyone and really make this plan a huge revelation and celebration to the communities.”

“VC companies in the region.”

“Need a forum for sharing information: an on-line portal that uses the same ideation process used by corporations.”

“What are we really trying to do. What is the plan so people can figure out where they fit. And a management structure of how each person really fits in and participates.”

“Need to know what we're doing. Make sure those in minority are represented; be open to listening to racial and ethnic thinking.”

“List of things to do. 6 month, 8 month goals. Plan what needs, shape the message and define who and how to communicate it.”

“Credibility - how can our Steering Team build the credibility to serve as true leaders in the region. We need early successes. Maybe a figurehead and powerful person involved. And, we also need a tangible action plan to move ahead - meaning the five-year innovation plan. The fact that we are decisive, aligned and quick in coming up with that plan may be our first win.”

3D. What short term action could be taken that would have the biggest impact on advancing innovation in the Tri-Valley?

“TVC (Tri-Valley Conservancy) construct a Winery Incubation Center with remaining cash and hand over stewardship to FOV (Friends of the Vineyards).”

“In order for the ecosystem to survive we need a balance. Let's asses what has worked and what has not, select what effort we want to drive forward.”

“Quickly put our white paper and "elevator story" pitches together. When do we need to organize, can we just be volunteers? Make a plan for implementing. Get local legislators involved, engaged and co-opted regarding job growth, etc.”

“One tangible item could be an incubator. In addition, a major headline grabber, such as winning a major grant as a regional effort, or perhaps attracting a major leader...such as, Barak Obama visiting to learn about the breakthroughs in cleantech.”

“Open Campus could be an early win (end of Summer).”

Profile of the Tri-Valley

Profile of the Tri-Valley

From Agriculture to Business Culture

The Tri-Valley region of northern California, comprises the township of Danville and the cities of Dublin, Livermore, Pleasanton and San Ramon, takes its name from three local valleys: Amador, Livermore and San Ramon. Its original residents were the Ohlone tribe of Native Americans who occupied the region until the arrival of the Spanish, who established the Mission San Jose to the south and took advantage of the Tri-Valley's soils and climate for farming and pasturing livestock.

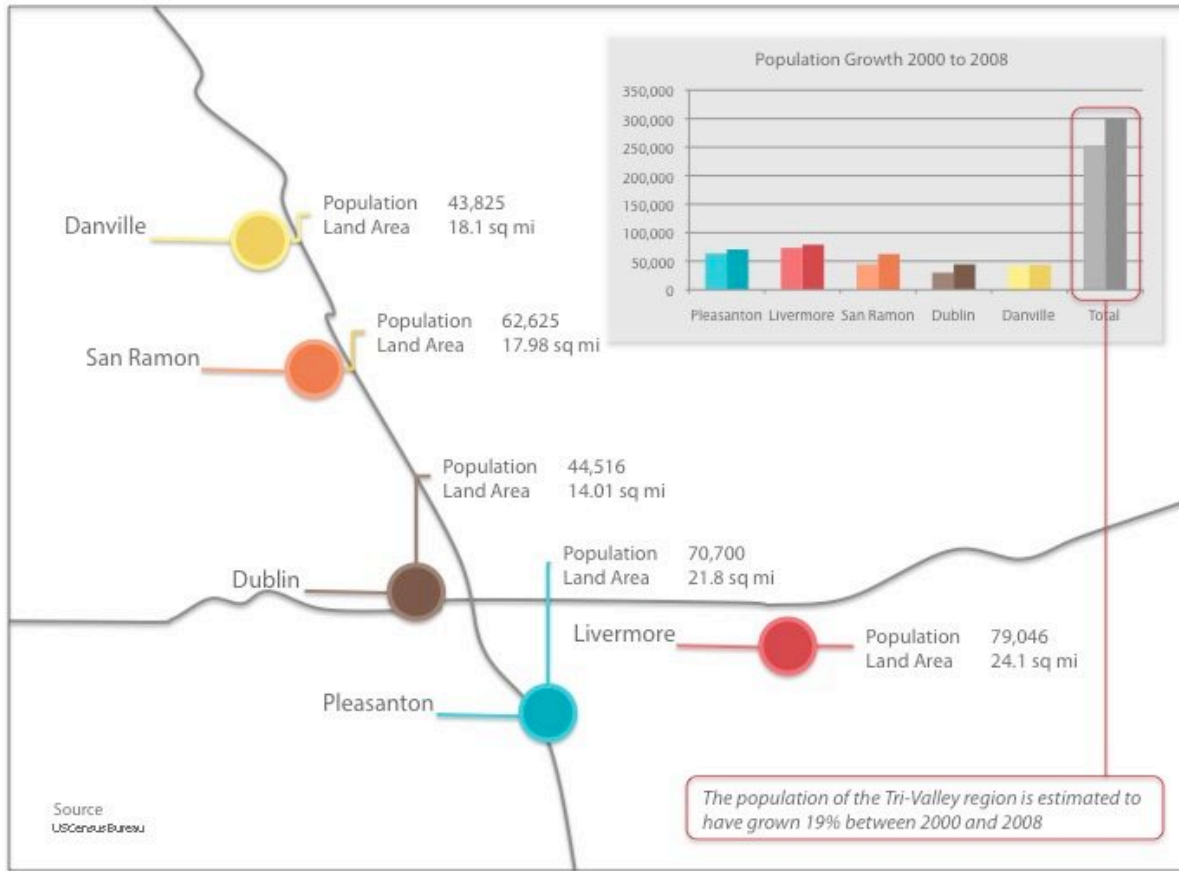
The area became more fully settled in the 1850s during the Gold Rush and the with the arrival of the transcontinental railroad, both of which increased the region's importance as an agricultural producer. A decade earlier the region's first wines were produced, kicking off a budding wine culture in the Livermore Valley which still thrives today. At the turn of the century, the region turned into a precursor of Hollywood, with 350-plus films made in the town of Niles, adjacent to Pleasanton, including early Bronco Billy Anderson and Charlie Chaplin films.

Following World War II, the Lawrence Livermore National Laboratories and the Sandia National Laboratories were established, once again transforming the region's character to a leading center of government research. In more recent decades, the region has begun matching public sector leadership with a blossoming private sector. The development of sprawling office parks such as Bishop Ranch Business Park and Hacienda Business Park has helped turn Tri-Valley into an attractive business region that is home to the corporate headquarters of industry leaders such as Chevron, Safeway and Sybase, as well as a fertile breeding ground for small startups.¹

¹ Wikipedia, Tri-Valley Convention and Visitors Bureau

Population Explosion

Figure 1 – Tri-Valley Land Area and Population



In the last several decades, the Tri-Valley region has played the role of bedroom community for the Bay Area and more recently the Silicon Valley, driving steady population growth over time. However, the ongoing influx of corporations both large and small to the region has accelerated this growth, not only in the Tri-Valley, but also in surrounding areas from which a good proportion of the Tri-Valley’s workforce commutes. The Tri-Valley region’s population (Figure 1) is estimated to have grown 19% between 2000 and 2008, which exceeds the population growth of the United States as a whole for the same period by over 10%. The populations of Dublin and San Ramon in particular have grown at the astounding rates of 49% and 40% respectively over eight years.²

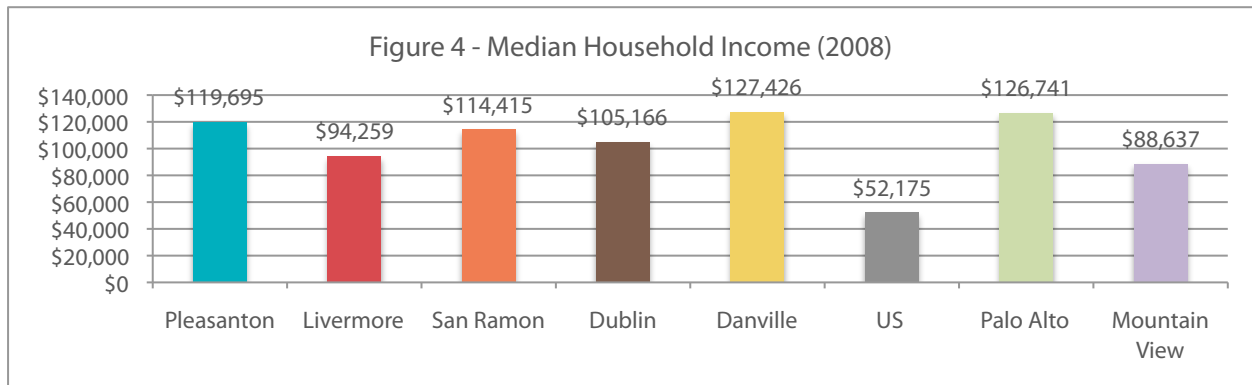
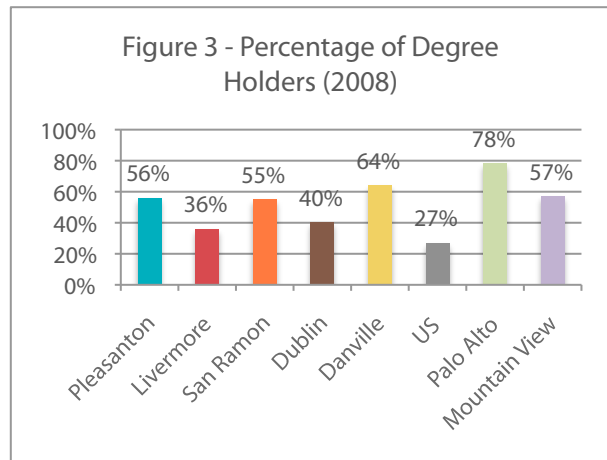
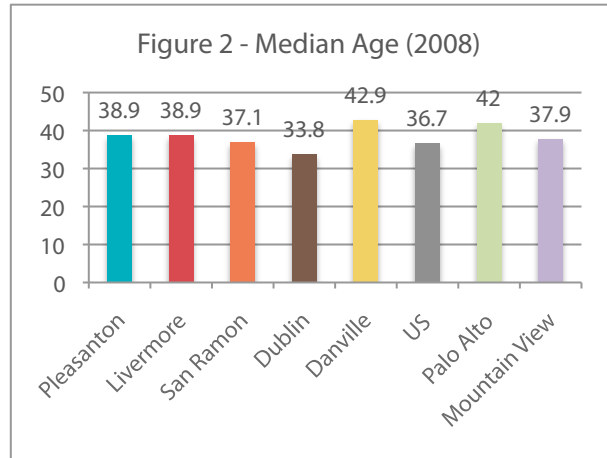
² US Census Bureau

Tri-Valley Residents: Wealthier, Better Educated

Jobs are in abundance in the Tri-Valley region, with an impressive ratio of companies to residents. However, the profile of the average Tri-Valley resident suggests that there are far more manager-level workers than anything else residing in the area. Average residents of the five municipalities tend to be slightly older than the national average (Figure 2), with the exception of Dublin, which has an average age nearly three years younger than the national average. Tri-Valley

residents also tend to be much more highly educated than the national average (Figure 3). Pleasanton, San Ramon and Danville are particularly impressive, with over 50% of residents holding a higher education degree. Education would seem to translate quite clearly into higher earnings, with the median household income of four out of the five municipalities more than double that of the United States as a whole (Figure 4). Only Livermore lags in terms of median household income, but not by much.

In the areas of age, education and median household income, the Tri-Valley region compares favorably with the Silicon Valley benchmark cities of Palo Alto and Mountain View. Danville especially is nearly identical to Palo Alto from a numbers standpoint in these three categories. The only area of significant disparity appears to be in education, with Palo Alto boasting an impressive 78% rate of degree holders. While this number indicates the intense concentration of educated workers in the Silicon Valley, it does not necessarily take away from the high rate of excellence in most Tri-Valley municipalities.³

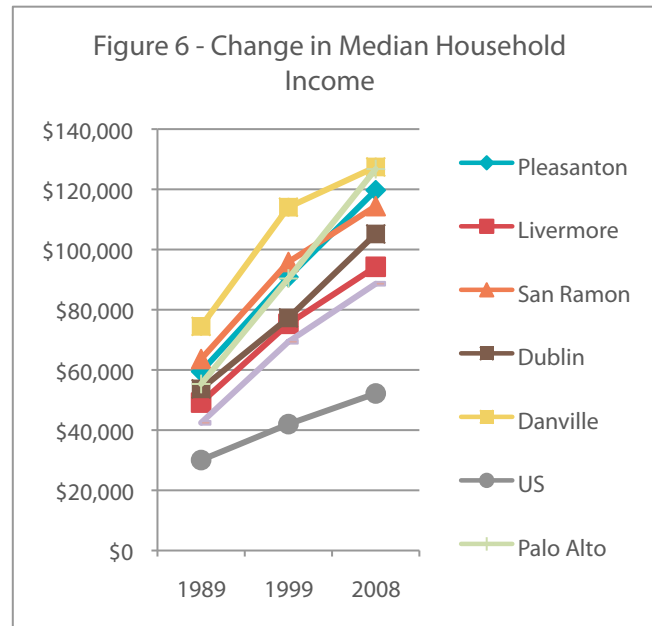
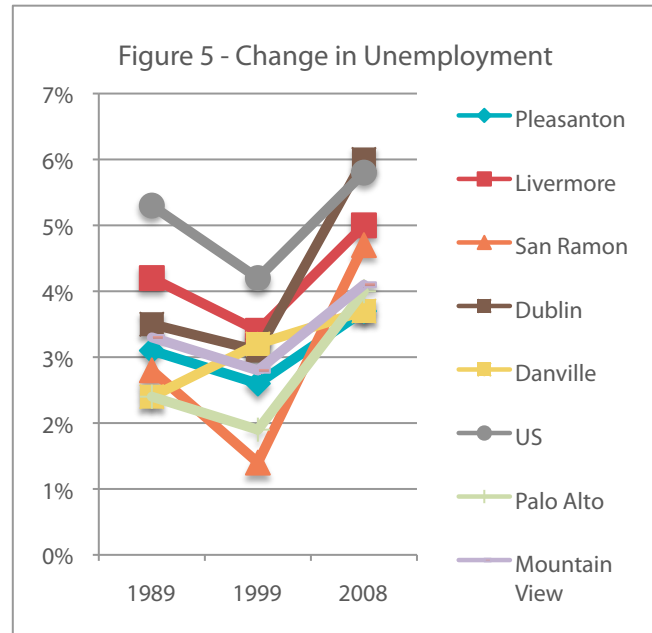


³ US Census Bureau

Economy: Historically Low Unemployment, High Income Levels

Located in one of the most vibrant economies of the United States, over time the Tri-Valley region has enjoyed consistently low unemployment and high median household income. While the region trends along the same path as the United States as a whole, in both categories it is comparatively stronger. Even in 2008, for example, Danville’s unemployment rate was more than two full percentage points lower than the national average (Figure 5). The lone exception is Dublin, which had an unemployment rate slightly higher than the national average in 2008. With the exception of Livermore, the Tri-Valley median household income has soared at more than twice that of the national average for almost two decades (Figure 6).

In these categories as well, Tri-Valley compares favorably with the Silicon Valley benchmark cities of Palo Alto and Mountain View. In terms of unemployment, Palo Alto trends somewhat lower than most, but overall resides within the same range as Tri-Valley. In terms of median household income, Danville, Pleasanton and San Ramon have all kept pace with Palo Alto over the last two decades, and Mountain View has actually trailed the Tri-Valley consistently in this category.⁴



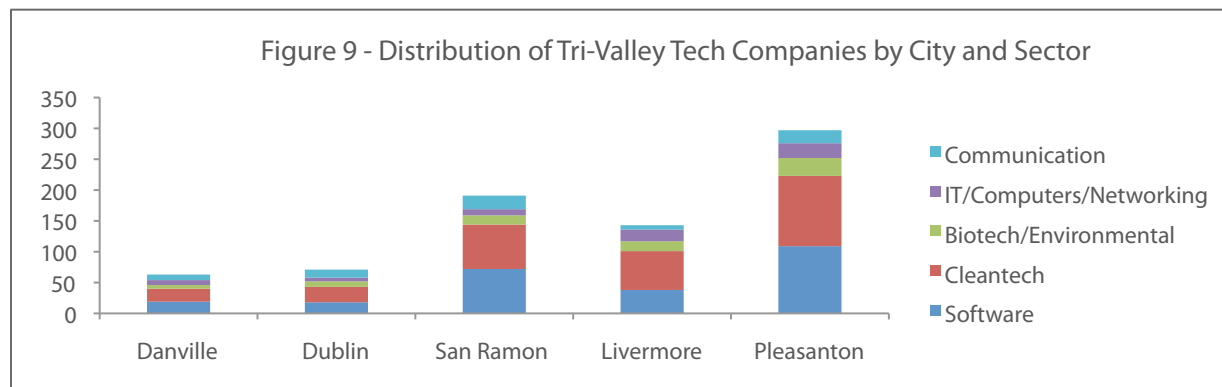
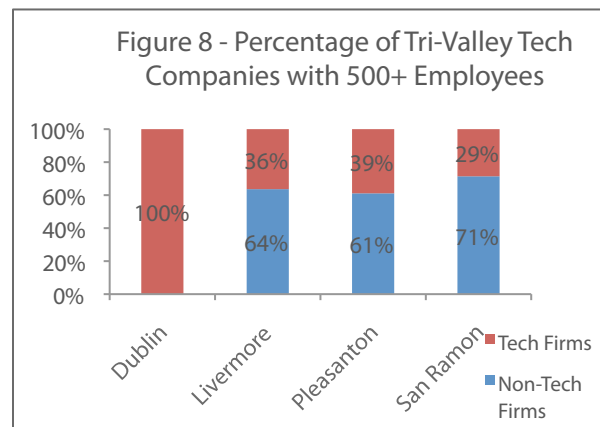
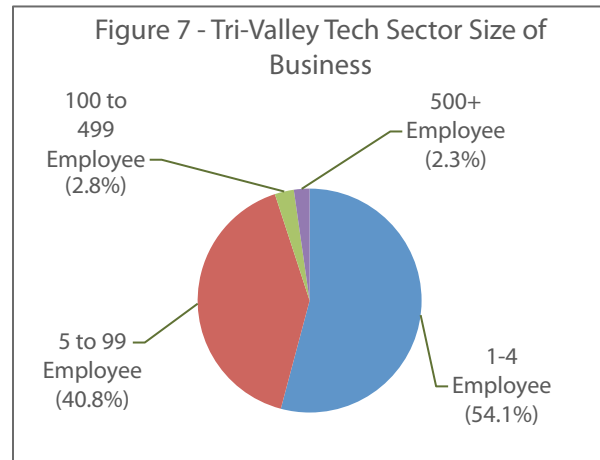
⁴ US Census Bureau, US Dept. of Labor Statistics

Tri-Valley Business: The Rise of Tech

Innovation happens in all industries, but arguably much of that innovation originates in the tech industries. Thus, a key indicator of any region’s capacity for innovation has to be its distribution of tech companies. There are currently 765 tech companies operating in the Tri-Valley region, indicative of a healthy environment for the industry as a whole.

Nearly 95% of Tri-Valley tech companies are small businesses or branch offices, although over two percent are large companies (Figure 7). When comparing these large companies to their non-tech counterparts in the region, the sizeable presence of tech becomes more clear. Large tech companies with employees of 500 or more comprise at least 29% of all large companies in the four major business districts of the Tri-Valley, and in the case of Dublin, 100% (Figure 8).

When looking at the distribution of tech companies by sector, it is clear that software and cleantech are the most prevalent, with a smaller but well-dispersed presence in communication, IT and biotech (Figure 9). The balanced dispersal of companies across sectors and cities indicates an environment of balance and stability that is less vulnerable to a sudden downturn in a specific technology sector.⁵



⁵ Data for the tech sectors profiled in this report was generated by InfoUSA based on the number of businesses in selected industry categories as defined by sets of NAICS codes that approximately represent the target sectors. Therefore business counts may include errors due to misclassifications and overlaps between sectors. And, because businesses in the target sectors (particularly in cleantech) share NAICS codes with companies that are not directly involved in innovation and technology development, counts may be on the high side. While efforts were made to improve the accuracy of the counts, the businesses included in this survey were not individually vetted.

Figure 10 – Largest Tri-Valley Tech Companies (100-500+ Employees)

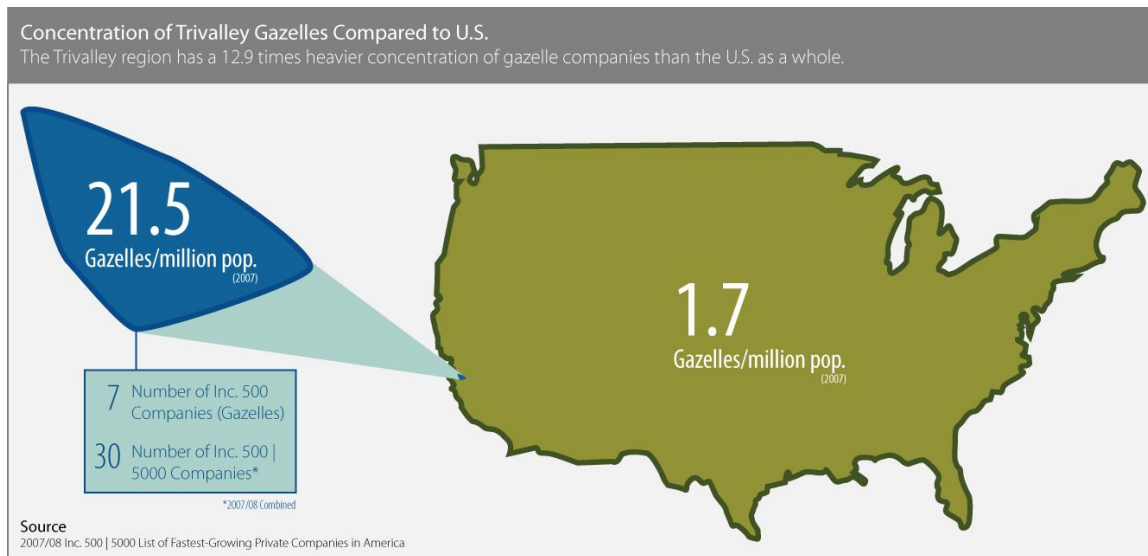
Company	Location	Sector
Activant Solutions Inc	Livermore	Software
Adept Technology Inc	Pleasanton	Cleantech
BMC Software Inc	Pleasanton	Software
Carl Zeiss Meditec	Dublin	Medical Tech.
Chevron Corp	San Ramon	Energy
Cooper Co Inc	Pleasanton	Medical Tech.
Ellie Mae Inc	Pleasanton	Software
EMC Corp	Pleasanton	Software, IT
ENGEO Inc	San Ramon	Engineering
Form Factor Inc	Livermore	Semiconductors
Front Range Solutions USA Inc	Pleasanton	Software
Fun Mobility Inc	Pleasanton	Telecom
Harland Financial Solutions	Pleasanton	Software
Johnson Controls Inc	Livermore	Electronics
Lawrence Livermore Natl Lab	Livermore	Energy, Cleantech
MARCOR Remediation Inc	Dublin	Biotech
Mirion Technologies Inc	San Ramon	Energy-related Tech
Oracle	Pleasanton	Software
Polycom Inc	Pleasanton	Communication
Roche Molecular Systems Inc	Pleasanton	Medical Research
Sabrix Inc	San Ramon	Software
Sage ACCPAC	Pleasanton	Software
Sandia National Labs Library	Livermore	Energy, Cleantech
SBC DataComm	Dublin	IT
Shaklee Corp	Pleasanton	Health Products
Simplex Grinnell	Livermore	Electronic Devices
Sybase Inc	Dublin	Software
SYMYX Technologies Inc	San Ramon	Software

Taleo Corp	Dublin	Software
Telpro Technologies Inc	San Ramon	IT
Thoratec Corp	Pleasanton	Medical Tech.
Transdyn Inc	Pleasanton	Cleantech
TRS-Ren Telco	Livermore	Electronic Devices
Tyco Healthcare	Pleasanton	Biotech
Valmark Industries Inc	Livermore	Electronic Devices

A Gazelle-Rich Region

Tri-Valley contains a disproportionately high share of “Gazelles”. “Gazelle” is a term coined to describe companies in the Inc. 500 list of fastest growing companies. Requirements for Inc. 500 | 5000 companies are that they be privately held, have generated at least \$100,000 in revenue three years prior to being listed, and at least \$2 million the year the list is compiled. Companies are ranked according to the percent increase in revenue over the three-year period. Northern Capital Insurance, the Miami, Florida-based company that topped the list in 2009, reportedly grew 19,812% from 2006-2008.

Figure 11

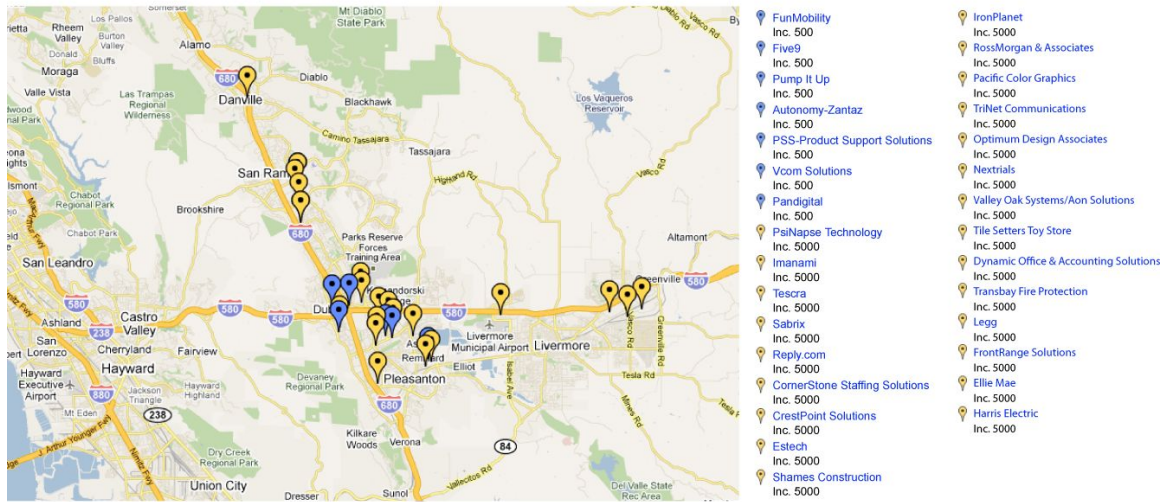


In 2007, seven Tri-Valley corporations made the Inc. 500 (FunMobility, Five9, Pump It Up, Autonomy Zantaz, PSS, Vcom Solutions and Pandigital). That year the Tri-Valley had 21.5 Gazelles per million of population, giving it a concentration of Gazelles that was 12.9 times higher than the United States as a whole. Moreover, in 2007 and 2008, Tri-Valley had a combined 30 companies make the Inc. 500 | 5000 list, with many firms appearing both years (Figure 11).

As the chart on the following page (Figure 12) shows, all Gazelles and many Inc. 5000 companies are concentrated in Dublin and Pleasanton. However, every municipality has at least one company on the list, and most have at least several. While the dispersion is somewhat weighted toward Dublin and Pleasanton, the overall indication is that the region as a whole has proven potential for nurturing innovative and profitable young companies.⁶

⁶ 2007/08 Inc. 500 | 5000 List of Fastest Growing Private Companies in America

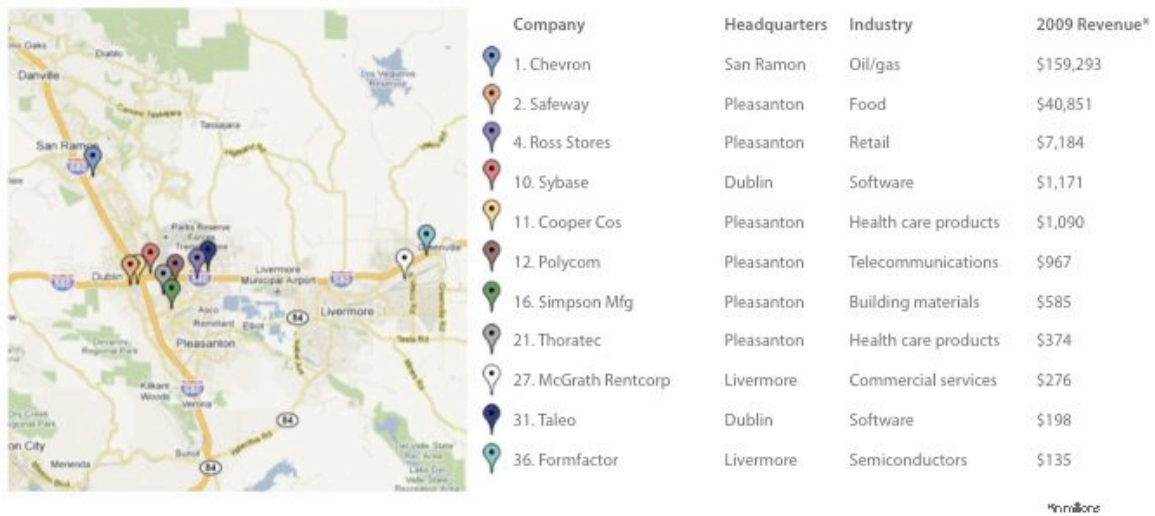
Figure 12 - Distribution of Inc. 500 | 5000 Companies in the Tri-Valley



Large Companies in the Tri-Valley

While the presence of Gazelles is indicative of the Tri-Valley’s positive environment for startups, the environment appears to be equally friendly to large, international corporations. Eleven of the East Bay’s top 50 companies in terms of revenue have corporate headquarters located in the region, including Chevron, Safeway, Ross Stores and Sybase (Figure 13). Furthermore, three of these companies are among the top 20 companies in the entire Bay Area.⁷

Figure 13 - Tri-Valley Companies in the East Bay Top 50



⁷ Contra Costa Times

With the notable exception of Chevron, most of these corporate headquarters are located in Pleasanton, which is home to six of the 11. This concentration of major corporations is a strong indicator of an already healthy innovation ecosystem in the Tri-Valley, the details of which are outlined in the next chapter.⁸

Figure 14

BAY AREA TOP 50

RANK	COMPANY/HEADQUARTERS	INDUSTRY	2009 REVENUE*	2008 REVENUE*	REVENUE % CHANGE	2009 PROFIT/(LOSS)*
1	Chevron Corp. , San Ramon	Oil/gas	\$159,293	\$255,112	-37.6%	\$10,483
2	Hewlett-Packard Co. , Palo Alto	Computers	116,756	118,697	-1.6	8,020
3	McKesson Corp. , San Francisco	Pharmaceuticals	108,283	106,639	+1.5	1,196
4	Wells Fargo & Co. , San Francisco	Banks	99,152	51,980	+90.8	12,275
5	Apple Inc. , Cupertino	Computers	46,708	33,038	+41.4	9,358
6	Safeway Inc. , Pleasanton	Food	40,851	44,104	-7.4	(1,098)
7	Cisco Systems Inc. , San Jose	Telecommunications	35,533	39,575	-10.2	6,069
8	Intel Corp. , Santa Clara	Semiconductors	35,127	37,586	-6.5	4,369
9	Oracle Corp. , Redwood City	Software	24,177	23,630	+2.3	5,662
10	Google Inc. , Mountain View	Internet	23,651	21,796	+8.5	6,520
11	Gap Inc. , San Francisco	Retail	14,197	14,526	-2.3	1,102
12	PG&E Corp. , San Francisco	Electric	13,399	14,628	-8.4	1,234
13	URS Corp. , San Francisco	Engineering/construction	9,249	10,086	-8.3	269
14	eBay Inc. , San Jose	Internet	8,727	8,541	+2.2	2,389
15	SYNNEX Corp. , Fremont	Software	7,953	7,749	+2.6	107
16	Ross Stores Inc. , Pleasanton	Retail	7,184	6,486	+10.8	443
17	Visa Inc. , San Francisco	Commercial services	7,132	6,514	+9.5	2,542
18	Gilead Sciences Inc. , Foster City	Biotechnology	7,011	5,336	+31.4	2,636
19	Core-Mark Holding Co. Inc. , S. San Francisco	Distribution/wholesale	6,532	6,045	+8.1	47
20	Yahoo Inc. , Sunnyvale	Internet	6,460	7,209	-10.4	598

⁸ Contra Costa Times

Ecology of Innovation

Ecology of Innovation - Overview

The Innovation Ecosystem

In seeking a framework for analyzing the economy of the Tri-Valley Region, we think that the most effective framework is that of an ecosystem—an innovation ecosystem. Looking at an economy from a more organic, less mechanical perspective has been gaining popularity among economists. William Wulf, the researcher, entrepreneur and former president of the National Academy of Engineering, has used the phrase *ecology of innovation* to describe how various factors interact in the U.S. economy to enhance or hinder its ability to innovate. These factors, according to Wulf, include intellectual property law, tax codes, patent procedures, export controls, and immigration regulations.

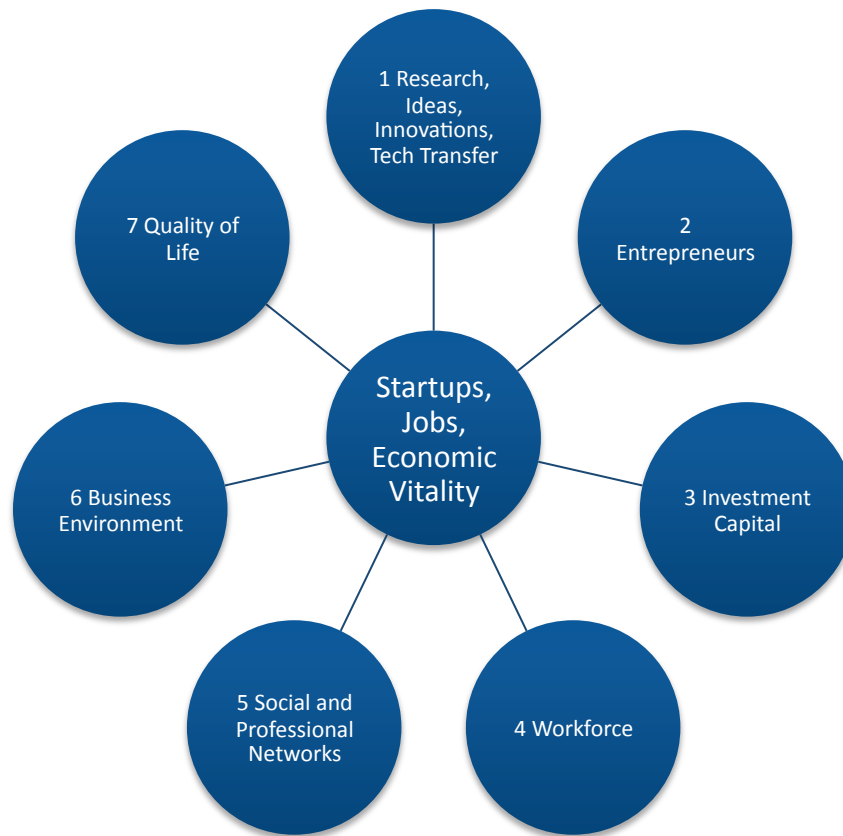
Ecology: The study of the relationship between organisms and their environment.

Ecosystem: A complex set of relationships among living resources, habitats, and residents of an area. When an ecosystem is healthy and is in balance it is sustainable. Diversity is a contributing factor to the health of an ecosystem.

In this report, we've taken a broader approach to identifying the key elements of the Tri-Valley innovation ecosystem. Like every living ecosystem, the regions survival is the outcome of the complex interplay of a number of factors. Viewed as an innovation ecosystem the Tri-Valley is lively creature which consumes and transforms knowledge and ideas into streams of innovative products and services through the continuous formation of new companies, within a complex matrix of relationships among various stakeholders in the region.

The Seven Key Elements of the Tri-Valley Innovation Ecosystem⁹

Figure 1 – The Ecology of Innovation



James F. Moore formally introduced the concept of a business ecosystem in a *Harvard Business Review* article in 1993.¹⁰ He described a business ecosystem as:

[An] economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organizations also include suppliers, lead producers, competitors, and other stakeholders. Over time, they co-evolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of an ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments and to find mutually supportive roles.

⁹ Based on the ideas developed in Munroe, T. and Westwind, M., *What Makes Silicon Valley Tick?*, Nova Vista Publishing, 2009

¹⁰ In this connection it is important to review the following books: James. F.Moore, *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems* (Harper Business, 1996);Marco lansiti and Roy Levien, *The Keystone Advantage: What the Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability* (Harvard Business School Press, 2004).

Major companies such as Hewlett Packard, IBM, SAP, Microsoft, Softbank, and Intel initially used this economic community concept for business strategy development. Lately it has been more broadly applied to many problems, including foreign policy as well as economic development strategy development.

So what are the fundamental elements that have served and sustained the Tri-Valley economy so successfully for a few decades? The seven key elements of the Tri-Valley innovation ecosystem are as follows:

1. Research, Ideas, Innovations, Tech Transfer

The presence of nearby world-class research universities and laboratories including the University of California (UC) at Berkeley, Stanford University, Lawrence Livermore National Laboratory, Sandia Laboratory, and UC San Francisco, along with Chevron's headquarters in San Ramon, is beginning to form the foundation of a sustainable innovation economy in many ways. These institutions generate and license intellectual property; link faculty with businesses as consultants and advisers; support faculty in the commercialization of their innovations; provide the private sector with a steady supply of talented engineers, designers, managers, etc.; provide innovators with access to cutting edge laboratories and equipment; and encourage a continuous dialogue among industry experts, faculty and students and the business community at large.

2. Entrepreneurs

In the innovation ecosystem, the entrepreneur is the biological host. Without the unique talents, traits and tenacity of the entrepreneur, bold new ideas would never see the light of day. We all have lots of new ideas, but the entrepreneur, driven by the energy and excitement of the core idea that is the seed of innovation, as well as by a hefty dose of self-interest and visions of personal gain, makes the commitment and takes the risk to manifest the innovation as a new product or service. A culture of entrepreneurialism and a tradition of serial entrepreneurship are key features of a high tech innovation ecosystem.

3. Investment Capital

Very few high-tech ventures can launch and grow to become world-class companies without large infusions of cash at crucial stages of development. While the Tri-Valley has relatively convenient access to high net-worth individuals (sometimes called angel investors), multimillion dollar venture capital firms, and top investment banks, the brutal competition for cash is one of the primary survival tests for both innovations and entrepreneurs. (Theoretically, this competitive process should assure that only the best innovations make it to market, but as we have seen, this has not always proven to be true.) Investors do more than just provide money; they also offer a wealth of technical expertise, business experience and valuable connections to resources and important people.

4. Workforce

No business venture can thrive without a skilled and dedicated workforce. The Tri-Valley region is becoming a magnet for talent from all over the world, and the growing diversity of the region's workforce is becoming a source of its strength and success. More so even than the social environment, the region's business environment provides a melting pot of people and ideas from a wide range of ethnic backgrounds, academic disciplines, business cultures, etc. At the same time, as in every ecosystem, organisms (i.e., skilled workers) at every level are opportunistic. In a culture where job-hopping is an accepted practice, retaining talented employees is challenging for every company. As a result, Tri-Valley companies are experimenting with various innovations in the workplace to keep their employees loyal and happy.

5. Social and Professional Networks

Just as money is the key fuel for innovative ventures, information is vital for survival and success, particularly when competing on a global scale. Information takes many forms and comes from myriad sources, including both formal and informal social and professional networks. Information, ideas, contacts and connections flow freely despite the competitive spirit that pervades in the region. The degree to which the region's business community has successfully managed the tension between collegiality and competitiveness has proven to be a major contributor to the healthy business environment.

6. Business Environment

Every ecosystem is dependent on the surrounding environment. That environment may be nurturing and supportive of vitality and growth, or it can be a source of stress and hinder or even threaten the long-term viability of the organisms within it. The same is true in an economic ecosystem. A region's economic environment includes many complex and interdependent factors: its social framework and political structure, its physical and economic infrastructures, its population profile, etc. In these ways and more, the Tri-Valley has a healthy business environment for innovation.

7. Quality of Life

Business is business, but we're all human, and it's safe to say that innovators, investors, and workers all appreciate a high quality lifestyle. The overall quality of life of the Tri-Valley and the larger Bay Area is a significant contributor to the Valley's economic success. With its comfortable climate, scenic beauty, first-rate cultural venues, cosmopolitan ambiance and proximity to sun and surf, the Tri-Valley region can easily qualify as very attractive regions in the United States. While quality of life may not seem the most important element of an innovation ecosystem, we believe that Tri-Valley's locale has played a significant role in its birth, evolution and success.

Innovation in the Interactive Web of the Ecosystem

As in any biological ecosystem, these key elements work in concert—no one element stands on its own. And, just like in nature, these elements form a web of relationships, interacting with each other in synergistic ways that strengthen the overall economic environment and contribute to the region’s resilience, sustainability as a hub of innovation. While it may seem that one or two elements—the National Research Labs and entrepreneurs, for example—are dominant factors in maintaining the balance of the system, seemingly lesser elements such as quality of life and business environment are also highly influential. Venture capitalists choose where they live and work and appreciate a region with cultural and recreational assets—they have neither the need nor the desire to compromise their tastes. A research university may be outstanding in training engineers and scientists, but if a region’s business environment or culture does not encourage entrepreneurship, talented innovators may relocate to more supportive areas like Austin, Texas, or Research Triangle Park, North Carolina.

As we will see, some or all of these same elements may be found in other regions, but the high quality and richness of these elements in the Tri-Valley are the sources of its sustained economic vitality. For example, other regions of the country have an abundance of skilled workers, but for various reasons, the industries that employ them and the surrounding social environments have not created cultures of innovation that emphasize life-long learning, creativity, risk taking, and openness to new ideas nor encourage the kind of adaptability that is innate in the Tri-Valley workforce. Other regions (e.g., Spain) may have an abundance of entrepreneurs, but they may approach starting a business as a form of lifetime employment rather than taking the more aggressive start-grow-sell path of the serial entrepreneur. Serial entrepreneurs are catalysts and active agents in the social and professional networks that inspire and support new entrepreneurs, thus fueling the innovation economy. Without them, a region’s networks lack the vitality to stimulate and support world-class business leaders.

Ecology of Innovation – Details of the Tri-Valley Innovation Ecosystem

A healthy ecosystem is one in which all elements have attained their natural maximum and enjoy a dynamic interplay with the others, driving further balanced growth of the entire ecosystem. An assessment of Tri-Valley's innovation ecosystem reveals that many if not most elements are healthy and growing. The continued significant presence of both startups and major corporations is a clear indicator of that the region's capacity for growth is on the rise. At the same time, the existence of a movement to spur greater coordination among the ecosystem's elements is both a sign that Tri-Valley has not yet achieved its full potential and a sign that it is moving in the right direction. This section provides a detailed account of how the seven elements of the Tri-Valley's innovation ecosystem are currently performing.

Key Element 1: Research, Ideas, Innovations, Tech Transfer

An innovation ecosystem needs at least one if not several primary sources of intellectual property (IP), the essence of innovation. Nearby research universities, think tanks, and corporate labs are important incubators for new ideas and innovation. They have a dual function. They provide critical training for the region's workforce and offer companies access to high-tech labs and equipment of addition to the creating of IP. Technology transfer programs help facilitate the commercialization of IP and bring returns in the form of royalties.

Research universities and research labs play a pivotal role in the evolution and success of innovation economies. The Tri-Valley economy has the potential of continuing to flourish partly because the region has access to outstanding world-class research universities such as UC Berkeley, UC San Francisco, and the Stanford University, and world-class research labs such as the Livermore and Sandia National Laboratories.

Lawrence Livermore National Laboratory

For more than half a century, Lawrence Livermore National Laboratory has applied cutting-edge science and technology to enhance national security. The Laboratory was established in 1952 at the height of the Cold War to meet urgent national security needs by advancing nuclear weapons science and technology. As a premier national security laboratory, the Lab's stated mission is to advance and apply science and technology to ensure the safety, security, and reliability of the U.S. nuclear deterrent, reduce or counter threats to national and global security, enhance the energy and environmental security of the nation, and strengthen the nation's economic competitiveness. The Lab's main areas of research focus include weapons and complex integration, national ignition facility and photon science, global security, computation, engineering, and physical and life sciences.¹¹

Sandia National Laboratories

Since 1949, Sandia National Laboratories has developed science-based technologies that support national security. Today, 300+ million Americans depend on Sandia's technology solutions to solve national and global threats to peace and freedom. Sandia Labs employs 850 full-time and 250 part-time workers. Through science and technology, people, infrastructure, and partnerships, Sandia's mission is to meet national needs in four key areas. The first area is nuclear weapons, in which the Labs work to ensure the stockpile is safe, secure, reliable, and can support the United States' deterrence policy. The second is energy, resources and nonproliferation, in which the Labs work to enhance the surety of energy and other critical infrastructures. The third is defense systems and assessments, in which the Labs work to address new threats to national security. The fourth is Homeland Security and defense, in which the Labs work to help to protect our nation against terrorism.¹²

¹¹ <https://www.llnl.gov>

¹² <http://www.sandia.gov>

Stanford University

The synthesis of teaching and research is fundamental to Stanford. Stanford is noted for multidisciplinary research within its schools and departments, as well as its independent laboratories, centers and institutes. Several national research centers are located at Stanford, including the Department of Plant Biology in the Carnegie Institution of Washington and the National Bureau of Economic Research. There are more than 4,400 externally sponsored projects throughout the university, with the total budget for sponsored projects at \$1.13 billion during 2009-10, including the SLAC National Linear Laboratory (SLAC). More than 4,000 graduate students and many undergraduates are involved in sponsored research at the university. Stanford's Office of Technology Licensing (OTL) brings technology created at Stanford to market. In 2008-09, Stanford received more than \$65.05 million in gross royalty revenue from 517 patents. The inventions Licensed by OTL include e-mail security, genome sequencing and Google. Stanford faculty and alumni have had a hand in creating some of the best-known American corporations, including Charles Schwab & Company, Cisco Systems, eBay, Electronic Arts, Gap, Google, Hewlett-Packard Company, IDEO, LinkedIn, Netflix, Nike, Orbitz, Sun Microsystems, and Yahoo!, among others.¹³

University of California, Berkeley

The University of California, Berkeley is one of the world's premier research universities. It is consistently rated among the top institutions in the world for the quality and breadth of its research enterprise, for the scholarly distinction of its faculty, for the excellence of its Ph.D. programs, and for the amount of funding received for support of its research programs. Berkeley ranks first amongst U.S. universities in the number of its research programs considered "distinguished" (32), according to the most recent National Research Council study of American universities. It also ranks first in the number of its Graduate Programs (35) considered to be among the top ten in their fields. Among its current faculty are 8 Nobel laureates, 135 members of the National Academy of Sciences, 82 members of the National Academy of Engineering, 12 recipients of the National Medal of Science, and 225 Fellows of the American Academy of Arts and Sciences. Over the past two decades, Berkeley faculty also received over 358 Guggenheim and 30 MacArthur Fellowships. UC Berkeley currently holds 562 US patents, 394 foreign patents and 273 active license agreements with commercial firms.¹⁴

California State University East Bay

California State University East Bay is the San Francisco East Bay area's high-access public university of choice. CSUEB serves the region with two scenic campuses — one in the Hayward Hills overlooking San Francisco Bay and the other in Concord. The University also operates a state-of-the-art professional development center in downtown Oakland and an innovative online campus, making it the California State University system's elearning leader. With a growing enrollment of more than 14,000, the University attracts students from throughout the region and state, as well as from more than 80 countries around the world. The university awards

¹³ <http://www.stanford.edu>

¹⁴ <http://berkeley.edu>

baccalaureate degrees in 52 areas of study, 26 graduate credentials and certificates, and masters degrees in 39 areas of study.¹⁵

Saint Mary's College of California

Saint Mary's College of California was founded in 1863 and is based in the Catholic, Lasallian and liberal arts traditions. For over 130 years the College has been guided by the Christian Brothers, the Catholic Church's oldest order dedicated exclusively to teaching. The college offers 38 baccalaureate majors and seven graduate degree programs.¹⁶

Las Positas College

Las Positas College is located on 147 acres in Livermore, in the midst of one of California's fastest-growing regions for business and scientific industry. Las Positas College currently enrolls approximately 8,800 day and evening students. The College offers a two-year curriculum for students seeking career preparation, transfer to a four-year college or university, or personal enrichment. Students who come to the College can choose any of 22 Occupational Associate Degrees, 16 Transfer Associate Degrees, and over 35 Certificate Programs.

In particular, the College supports the development of an innovation-driven workforce by offering degrees and certification in the areas of applied technologies, health sciences, business, entrepreneurial, marketing, and work-based learning, computing studies, mathematics, engineering and science. It also has a store management program sponsored by Safeway, a partnership with GM and links to the Labs.¹⁷

Diablo Valley College – San Ramon Valley Campus

The San Ramon Center is a campus of Diablo Valley College, furnishing educational services for those who live and work in the San Ramon Valley. Founded in 1986 as the Center for Higher Education (CHE), SRC now serves over 5,000 students of all ages and interests each semester. SRC offers general education courses, which allow students to fulfill all their lower division pre-transfer requirements. In addition, SRC's extensive computer training curriculum provides hands-on experience using hardware and software with business applications. In particular, the College supports the development of an innovation-driven workforce by offering degrees and certification in computer information systems, math and science.¹⁸

¹⁵ <http://www20.csueastbay.edu>

¹⁶ <http://www.stmarys-ca.edu>

¹⁷ <http://www.laspositascollege.edu>

¹⁸ <http://www.srvc.net>

Other University Programs and Affiliations

Livermore

Phoenix MBA and Tech Post Grad Supercenter

Closed four years ago, but soon to reopen due to renewed activity in the region¹⁹

UC Berkeley/Davis and others

Established local partnerships with a number of regional institutions²⁰

Pleasanton

Valley Care Medical Center

Has ties to UCSF for providing shared medical services and UC Davis for joint cancer research²¹

San Ramon

Satellite MBA Programs

USF, UC Davis, Sacramento State and Saint Mary's have all established satellite MBA programs in San Ramon²²

Chevron

Joint Research Programs

Partnering with UC Davis to explore next generation biofuels, other programs with Stanford, UC Berkeley and USC²³

¹⁹ Interview with Rob White, Livermore Economic Development Director

²⁰ Interview with Rob White, Livermore Economic Development Director

²¹ Interview with Pam Ott, Pleasanton Economic Development Director

²² Interview with Marc Fontes, San Ramon Economic Development Director

²³ Interview with Joseph Caggiano, Chevron Senior Consultant

Key Element 2: Entrepreneurs

Entrepreneurs turn ideas into products. Their willingness and ability to accept the risks associated with taking an innovative product to market is influenced by the region’s culture. Any region striving to develop a sustainable innovation economy needs to foster a culture of entrepreneurialism in its business community and nurture next-generation entrepreneurs in its educational institutions.

An entrepreneur is a visionary—someone with an innovative idea, a deep belief in the product around which that idea is formed, and the willingness and determination to bring that product to market. Quite often entrepreneurs take significant personal risks and assume tremendous financial burdens. While entrepreneurs often turn to angel investors (many of whom are successful entrepreneurs themselves) or venture capital firms for money, entrepreneurs inherently have their own “skin in the game” financial burdens as they strive to bring concepts to life as technologies or products.

Well-Known Tri-Valley Entrepreneurs



Ken Behring

Real estate developer, former owner of the Seattle Seahawks football team, and philanthropist. Developed the Blackhawk country club, San Ramon’s Canyon Lakes Development, the Blackhawk Museum and the Wheelchair Foundation.²⁴



Steve Burd

CEO of Safeway. Under Burd, Safeway has launched a number of industry-leading programs, including its Healthy Measures employee health insurance incentives, giftcard programs, gas stations, renewable energy programs and high-end private labels.²⁵



Joe Callahan

Real estate developer who started the Hacienda Business Park.

²⁴ Wikipedia

²⁵ Ibid., Interview with Susan Houghton, Safeway Director of Public and Government Affairs



Dave Duffield

U.S. software industry icon with consistent presence in the Forbes World's Richest People. Best known as the co-founder and former chairman of PeopleSoft. Also founded Integral Systems, Information Associates, and Workday.²⁶



Alex Mehran

Real estate developer who started the Bishop Ranch Business Park.



Phil Wente

Fourth generation winegrower of Wente Vineyards, the country's oldest continuously operating winery, and among the country's 50 largest.²⁷

²⁶ Wikipedia, http://www.workday.com/company/leadership_team/dave_duffield.php

²⁷ <http://www.wentevineyards.com>

Gazelle Company Founders²⁸

Name	Adam Lavine	Todd Funk	Keith Ward
Companies Founded	FunMobility Specular International	PSS	PSS

Name	Archie Messenger	Gary Storm	Dean Finnegan
Companies Founded	PSS	Vcom Solutions	Pandigital

Name	Sylvia Luneau	Robert Haaverson	Robert E. Grove, PH. D.
Companies Founded	PsiNapse	Imanami The Haaverson Corporation	TRIA Beauty SpectraGenics Star Medical Technologies DermaCare

Name	Payam Zamani	Randy Wheeler
Companies Founded	Reply.com PurpleTie Autoweb.com	Valley Oak Systems/ Aon eSolutions

²⁸ <http://funmobility.com>, <http://www.psshhelp.com>, <http://www.vcomsolutions.com>, <http://www.pandigital.net>, <http://www.psinapse.com>, <http://www.imanami.com>, <http://www.triabeauty.com>, <http://www.reply.com>, <http://www.aon-esolutions.com>

Key Element 3: Investment Capital

Ideas are the soul of innovation. Money is the lifeblood. Access to seed and early-stage money from angel investors during the start-up stages and money for expansion from venture capital firms is critical for high-tech companies. Investors support innovation by providing entrepreneurs with more than money—they provide valuable business expertise, links to personal contacts and access to social and professional networks.

Typical high-tech entrepreneurs in Tri-Valley are not looking to set up lifestyle businesses—firms that support a certain lifestyle for them. Rather, they have an ambitious vision that usually involves bringing a revolutionary new product to the market and a dream of making lots of money by doing so.

Innovation Needs Cash

It's a rare high-tech company that can expand fast enough without an infusion of cash. Cash is the lifeblood of high-tech companies, particularly when a company is likely to be engaged in months or years of product development, during which phase there will be little or no income generated by sales. Like the vision itself, the entrepreneur's need for cash usually is quite large; usually it runs into millions of dollars. The ability of an entrepreneur to raise sufficient cash to pursue his or her vision is often equally as important as the ability to envision and invent a new product or service.

At the point that personal resources are no longer sufficient to support growth, an entrepreneur must seek outside funding, typically from family and friends. This can be a mixed blessing. Certainly friends and family may be able to provide funding, but taking their money can jeopardize personal relationships and complicate future funding—particularly if promises are made to seat these early investors on the company's board or non-dilution stock commitments are made. More sophisticated entrepreneurs will avoid this source of funding in favor of seeking seed and start-up money from high net-worth individuals who can not only provide cash, but also business expertise and personal connections to potential sources of the next round of funding. These high net-worth individuals, or accredited investors, as they are called by the Securities and Exchange Commission (SEC), are also often called angel investors (or business angels, in Europe).

The Key Role of Angel Investors

The presence of large and media-visible venture capital firms has often overshadowed the role of angel investors in the development of a high-tech innovation economy. VC investments are usually made in large amounts and funding events frequently attract press coverage, while angel investments are typically smaller and often occur under the media's radar. It is important to note that angel investors are the largest source of seed and start-up capital, providing early-stage funding when VCs are often not willing to take the risk. The University of New Hampshire's Center for Venture Research reports that “angels continue to be the largest source of seed and start-up capital, with 46% of 2006 angel investments in the seed and start-up stage.”

Venture Capital: Overview

As defined by the National Venture Capital Association, venture capital firms are “pools of capital, typically organized as a limited partnership, that invest in companies that represent the opportunity for a high rate of return within five to seven years. Far from being simply passive financiers, venture capitalists foster growth in companies through their involvement in the management, strategic marketing and planning of their investee companies. They are entrepreneurs first and financiers second.”²⁹

Partial List of VC Active in the Region³⁰

*An asterisk indicates one of the most active 60 U.S. firms in 2009 in terms of deals closed according to the PricewaterhouseCoopers/National Venture Capital Association MoneyTree Report

Company	Aisling Capital	Battelle Ventures	Cascade Capital
Location	New York, NY	Princeton, NJ	Seattle, WA
Tri-Valley Companies Funded	TRIA Beauty (Pleasanton)		

Company	Chevron Technology Ventures Investments	De Novo Ventures*	Foundation Capital*
Location	San Ramon	Palo Alto, CA	Menlo Park, CA
Tri-Valley Companies Funded		TRIA Beauty (Pleasanton)	

²⁹ <http://nvca.org/def.html>

³⁰ <http://www.triabeauty.com>, www.five9.com, www.sabrix.com, www.estech.com, www.reply.com, www.aislingcapital.com, www.battelleventures.com, www.cascadecapital.org, www.denovovc.com, www.foundationcapital.com, www.humwin.com, www.mdv.com, www.mosaicvp.com, www.nbgiventures.com, www.outlookventures.com, www.partechnvc.com, www.saintsvc.com, www.scalevp.com, www.smartforest.com, www.technologypartners.com, www.thpartners.net, www.trinityventures.com, www.bioasia.com, www.vsplp.com, <https://www.pwcmoneytree.com/MTPublic/ns/index.jsp>, Interview with Erik Stenehjelm, Director, Industrial Partnership Office - LLNL

Company	Hummer Winblad Venture Partners	Mohr Davidow Ventures*	Mosaic Venture Partners
Location	San Francisco, CA	Menlo Park, CA	Toronto, Canada
Tri-Valley Companies Funded	Five9 (Pleasanton)	T FormFactor (Livermore), Sabrix (San Ramon), Simbol (Pleasanton), Vantive (Pleasanton)	Five9 (Pleasanton)

Company	NBGI Ventures	Outlook Ventures	Partech International
Location	London, England	San Francisco, CA	San Francisco, CA
Tri-Valley Companies Funded	Estech (San Ramon)	Reply! (San Ramon)	five9 (Pleasanton)

Company	Saints Capital	Scale Venture Partners*	SmartForest Ventures
Location	San Francisco, CA	Foster City, CA	Portland, OR
Tri-Valley Companies Funded	Estech (San Ramon)	Reply! (San Ramon)	Reply! (San Ramon)

Company	Spiegel Partners	Technology Partners	Telegraph Hill Partners
Location	Dana Point, CA	Palo Alto, CA	San Francisco, CA
Tri-Valley Companies Funded	Reply! (San Ramon)	TRIA Beauty (Pleasanton)	Estech (San Ramon)

Company	Trinity Ventures	Vivo Ventures	VSP Capital
Location	Menlo Park, CA	Palo Alto, CA	San Francisco, CA
Tri-Valley Companies Funded	Sabrix (San Ramon)	TRIA Beauty (Pleasanton)	Sabrix (San Ramon)

Government Grants for Startups

State and federal governments have programs to provide development moneys to startups with no request for equity in return. The Labs have the capability to help startups apply for grants to achieve this type of funding.³¹

³¹ Interview with Erik Stenehjelm, Director, Industrial Partnership Office - LLNL

Keiretsu Forum

Keiretsu Forum is an investment community of accredited private equity investors, venture capitalists and corporate/institutional investors. Forum members invest in high-quality, diverse investment opportunities. The community is strengthened through its involvement in social and charitable activities. Keiretsu Forum has chapters in Northern California (San Francisco, East Bay, Silicon Valley, and North Bay), Southern California (Westlake Village, Los Angeles, San Diego, and Orange County), Seattle/Northwest (Seattle, Bellevue/Eastside, Portland, and Boise), Denver/Rockies, New York/Tri State, Beijing, China; Barcelona, Spain; Paris, France, and London, England. Since its inception, Keiretsu Forum members have invested over \$180m in 200 companies in technology, real estate, health care/bio tech/life sciences and other sectors of the economy with high growth opportunity.³²

2010 IPO Announcements

The ability for angel investors and venture capitalists to generate returns on their investments is predicated on the ability at some point after making the investment, to sell their ownership in the company. One major source of re-capitalizing is through an Initial Public Offering (IPO), where a company sells shares into the public stock market. When a company reaches a point of maturity where it is capable of raising capital in the public markets, the venture capitalists have an opportunity to sell their shares and make a return on their initial investment. Venture capitalists can also generate a return by selling their shares in a company through a private transaction, typically a buyout of the company, although IPOs have been a route that has provided significant returns in the past.

During the economic downturn in 2007-2009, few IPOs were achieved, depressing the expected returns for investors. In 2010, four companies in the Tri-Valley have announced intentions of IPO offerings, which is a positive sign for investors:

Ellie Mae (Pleasanton) - \$86 million³³

IronPlanet (Pleasanton) - \$92 million³⁴

Mirion (San Ramon) - \$202 million³⁵

Reply (San Ramon) - \$60 million³⁶

³² www.keiretsuforum.com

³³ <http://sanfrancisco.bizjournals.com/sanfrancisco/stories/2010/05/03/daily4.html>

³⁴ <http://www.bizjournals.com/sanjose/stories/2010/03/15/daily84.html>

³⁵ <http://www.reuters.com/article/idUSTRE62F2PB20100316>

³⁶ <http://techcrunch.com/2010/02/22/reply-com-files-ipo/>

Key Element 4: Workforce

An innovation ecosystem needs a large pool of talented workers to fill the myriad positions created by new start-ups, expanding companies and well-established firms. Workforce diversity brings new ideas, new connections and access to global resources. Smart companies understand that competition for talented workers is stiff and that perks are often an important factor in keeping employees happy and loyal.

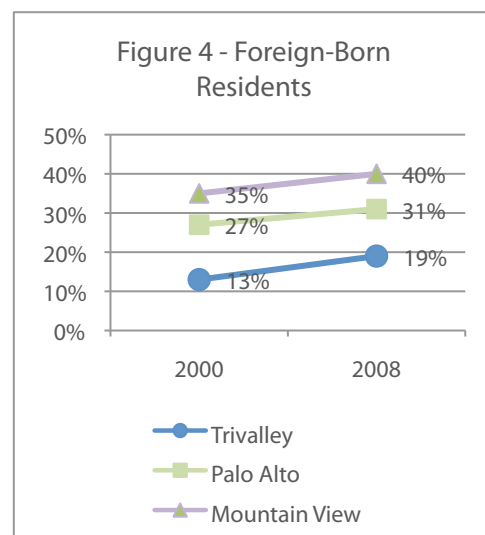
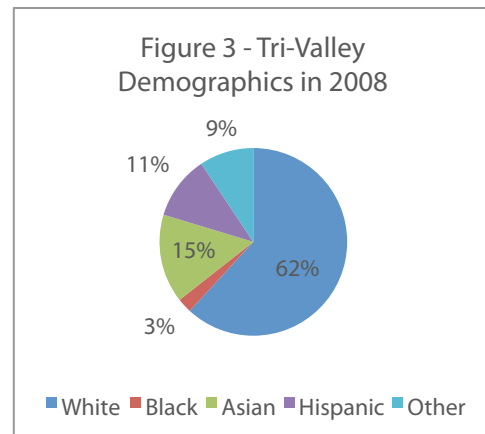
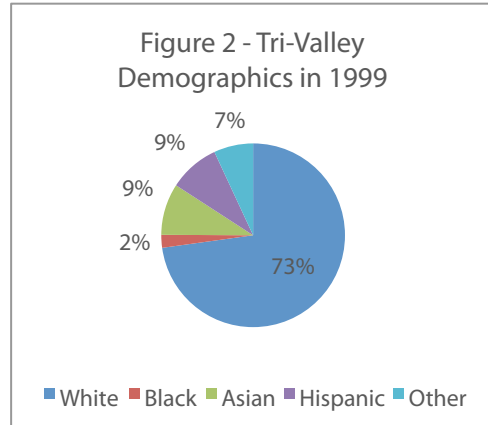
A Rapidly Growing Asian Demographic

Tri-Valley has traditionally been a racially homogenous region. That is changing. From 1999 to 2008, the proportion of whites to other ethnic groups shifted from 73/27 to 62/38. While all minority ethnic groups grew over that time period, the number of Asians in particular grew by more than 100% (Figures 2&3).

The growth in Asian population is encouraging from the standpoint of innovation, if only because it promises to strengthen the workforce makeup. In general, Asian Americans are active in the business, tech and science sectors, and Asian American households have the highest median income. They are also the most likely to complete higher education and hold the highest number of graduate degrees.³⁷

A Rising Immigrant Class

Immigrants have historically been a double-edged sword for countries the world over, often bringing as many problems as benefits. Drawbacks aside, there is no doubt immigration has had a major positive influence on driving innovation in the United States, particularly in recent times. More than half of Silicon Valley startups were founded by immigrants over the last decade, and Indian and Chinese immigrants contribute to a disproportionately high number of patent registrations, including 33% filed by Intel, 23% by Microsoft and 22% by IBM in 2006.³⁸



³⁷ US Census Bureau

³⁸ http://www.businessweek.com/technology/content/feb2009/tc2009029_333899.htm

This is potentially good news for the Tri-Valley, where the number of foreign-born residents has increased at a rate comparable to that of Palo Alto and Mountain View over the last eight years (Figure 4). However, Tri-Valley still lags behind those two cities in terms of percentage of the population that is comprised of foreign-born residents. Tri-Valley is at 19%, which still tops the national average of 12.5%, while Palo Alto is at 31% and Mountain View 40%.³⁹

Educational Resources

While there are a number of premier educational institutions in the Bay Area that feed talent to the region such as Stanford, Berkeley, UCSF, Cal State East Bay and Saint Mary's, none of these institutions are located in the Tri-Valley region proper. Tri-Valley competes with San Francisco, Oakland, Silicon Valley and beyond for the talent pool of these institutions.

Tri-Valley is home to Las Positas College, Diablo Valley College's San Ramon Valley campus, and satellite MBA programs courtesy of USF, UC Davis, Sacramento State, Saint Mary's and Phoenix. However, none of these institutions and programs has risen to the level of even Cal State East Bay, let alone a Stanford. Establishing a much stronger undergraduate and post-graduate institution is recognized by most regional stakeholders as a critical component in enhancing the region's potential as an innovation leader.

³⁹ US Census Bureau

Key Element 5: Social and Professional Networks

Inflow of top-flight talent is critical to the region's success. Formal and informal social and professional networks are important interconnected webs linking inventors, innovators, entrepreneurs, investors, engineers, as well as lawyers, bankers, accountants and other professionals. These networks are channels for sharing ideas and information and connecting with resources, money, talent, markets, partners, suppliers and customers worldwide. They also build community and a support system for the vast diversity of people who come from all over the world and work in the region.

East Bay Economic Development Alliance⁴⁰

The East Bay Economic Development Alliance (East Bay EDA) is a public/private partnership serving the San Francisco East Bay (Alameda and Contra Costa Counties) whose mission is to establish the East Bay as a world-recognized location to grow businesses, attract capital and create quality jobs.

Key East Bay EDA areas of focus include:

- Business development
- Collaborating to help secure ARRA and other federal Stimulus funds for the region
- Administrative support of the East Bay Green Corridor Partnership (of which the Lawrence Livermore National Laboratory became a member in 2009)
- Increase affordable housing in the region
- Support for heavy industry through participation in the Bay Area Industrial Round Table
- Workforce education
- Sharing regional statistics and information

Tri-Valley Business Council⁴¹

Founded in 1994, the Tri-Valley Business Council is widely respected by elected officials, policy makers and other civic leaders as the definitive voice of businesses in the Tri-Valley, including more than 50 industry-leading companies. The Council supports 295,866 residents living and working in Alameda and Contra Costa Counties and boasts 18,000 companies providing approximately 140,000 jobs with annual payroll/wage figures exceeding \$8.5 billion.

The Tri-Valley Business Council Impacts Public Policy by:

- Forming strategic partnerships with businesses
- Meeting with public officials and serving as a regional convener
- Hosting meetings/events to discuss relevant issues
- Informing businesses and the public with its perspective

⁴⁰ www.eastbayeda.org

⁴¹ www.Tri-Valley.org

Tri-Valley Business Builders (BNI)⁴²

The Tri-Valley Business Builder chapter of BNI is a collection of local professionals and business owners who have chosen the Business Networking International (BNI) referral organization as a means to accomplish their goal of growing their businesses. BNI is a business-marketing program that allows one person from each professional category to join a chapter. The sole purpose of the group is to increase business through a structured system of giving referrals.

East Bay Green Corridor Partnership⁴³

On December 3, 2007, the mayors of Oakland, Berkeley, Richmond and Emeryville, along with UC Berkeley Chancellor Robert Birgeneau and Lawrence Berkeley National Laboratory director Steven Chu, announced an agreement to promote the East Bay as the nucleus of a "green wave" of research and manufacturing. In 2009, the Lawrence Livermore National Laboratory became a member of the partnership.

Stated goals of the Partnership include:

- Create Conditions that Support New and Emerging Green Industry
- Strengthen Existing Programs Promoting Technology Development and Transfer
- Support Employment Development Opportunities in Emerging Green industries
- Build a More Cohesive Regional Identity in Energy-Related Green Business Sectors
- Protect Partner Economies from Climate Change and Energy Shocks
- Cooperate in Obtaining Grants and Project Funding for Green Research and Entrepreneurship
- Improve the Living Environment and Quality of Life

Chambers of Commerce⁴⁴

The Chambers of Commerce of the five Tri-Valley municipalities provide a number of invaluable services to locally based businesses, including business resources, connecting businesses with new opportunities, coordinating educational, networking and other business-related events, making government policy accessible to local businesses, providing a forum for businesses to air their concerns and opinions, promotion of local businesses and providing supplemental community information.

⁴² www.Tri-Valleybni.com

⁴³ <http://www.oaklandnet.com/ebgc/>

⁴⁴ www.danvilleareachamber.com, www.dublinchamberofcommerce.org, <http://www.livermorechamber.org>, www.pleasanton.org, www.sanramon.org

Key Element 6: Business Environment

A region's business environment affects corporate viability and the ability of the region to compete in the global marketplace. It also affects the fundamental ecology of innovation of the region. Without favorable business conditions including adequate professional and business services (e.g. IP attorneys, financing specialists), companies operate at a competitive disadvantage and the relationships that exist between the various components of the ecology are out of balance.

In a natural environment, just as latitude, temperature, moisture, air pressure, topography, and many other factors cause the weather of a region to be in constant flux, myriad interacting factors in an economic ecosystem is constantly changing. At any given time, the business climate represents a snapshot of the overall business and economic environment at that time. In addition to macro factors (the social framework and political structure, physical and economic infrastructures, population profile, etc.), a region's day-to-day business climate is influenced by other constantly changing factors. Among these are the prevailing attitudes of the local, regional and state governments and financial institutions toward business and economic activity, the current taxation regimen, costs of living, and so forth. In addition the presence various business services such as appropriate types of accounting and legal firms, banking, and various types of consultancies is critical.

Livermore Valley Open Campus⁴⁵

The Livermore Valley Open Campus is a proposed development of a 110-acre site on the east side of the Livermore and Sandia Lab facilities outside security gates. The area would function as a collaboration site for government and private sector scientists and engineers to solve challenges in transportation, energy and other sectors. Partners who have already agreed to cooperate on the project include the Department of Energy and NNSA. Areas of focus may include Combustion & Transport, Supercomputation and a facility dedicated to the National Ignition Facility.

This effort holds a tremendous amount of promise in becoming one of the driving forces behind innovation in the Tri-Valley, providing a new bridge between private enterprise and government research and creating an ideal environment for startup incubation.

iGATE⁴⁶

The iGATE program consists of six iHub programs approved by the California state government to drive technology innovation, based off a proposal submitted by the Livermore and Sandia National Laboratories. Other partners UC Berkeley, UC Davis, and a number of other public, private and educational institutions and organizations. The mission of iGATE will be to maximize the economic impact of green transportation and clean energy technologies through expedited

⁴⁵ <http://www.portfolio.com/industry-news/technology/2009/07/10/livermore-sandia-labs-partnering-with-businesses-schools>, Interview with Rob White, Economic Development Director, City of Livermore

⁴⁶ https://share.sandia.gov/news/resources/news_releases/california-selects-livermore-valley%E2%80%99s-i-gate-as-state-innovation-hub/, Interview with Rob White, Economic Development Director, City of Livermore

technology transfer, entrepreneurial assistance, collaboration opportunities, academic alliances and a technology incubator for the development of high-growth green businesses.

The i-GATE effort is designed to drive Tri-Valley as the core of an energy research cluster that will rapidly expand to benefit the regional economy and the state of California, create jobs, mitigate climate change, increase energy security, educate the future technical workforce and form an interlocking innovation web. iGATE is the only innovation hub focused on Energy and Transport, while the others center around Cleantech, meaning iGATE will avoid direct competition with the other iHub regions. It will leverage the Open Campus initiative, creating synergies to drive a significant growth in the region.

Professional Services Firms

In addition to many high quality regional firms, the Tri-Valley has access to top practitioners and professional services firms to support larger businesses and complex business transactions. Most of the top global firms do not have offices located in the Tri-Valley, but are highly accessible and in the adjacent Silicon Valley and San Francisco areas.

Top 10 U.S. Law Firms in Vicinity⁴⁷

Baker & McKenzie – San Francisco, Palo Alto

DLA Piper Rudnick Gray Cary – Palo Alto

Jones Day – San Francisco, Palo Alto

White & Case – Palo Alto

Latham & Watkins – San Francisco

Skadden Arps Slate Meagher & Flom – San Francisco, Palo Alto

Sidley Austin Brown & Wood – San Francisco

Greenberg Traurig – Palo Alto

Mayer Brown, Rowe & Maw – None

Morgan, Lewis & Bockius – San Francisco, Palo Alto

Top 10 U.S. Accounting Firms in Vicinity⁴⁸

Deloitte & Touche – Walnut Creek, Oakland, San Francisco, San Jose,

Ernst & Young– Pleasanton, San Francisco, San Jose, Palo Alto

PricewaterhouseCoopers – San Francisco, San Jose

KPMG – Oakland, San Francisco, Mountain View

⁴⁷ <http://www.ilrg.com/nlj250>, Google Maps

⁴⁸ <http://www.accountingmajors.com/accountingmajors/articles/top100.html>, Google Maps

Grant Thornton – San Francisco, San Jose

McGladrey & Pullen – San Francisco, Mountain View

BDO Seidman – San Francisco, San Jose

Mayer Hoffman McCann – San Jose

Crowe, Chizek and Co. – None

Armanino McKenna – San Ramon, San Francisco, San Jose

Local Government Policies and Programs⁴⁹

Tax Breaks and Other Financial Incentives

Livermore offers a subsidy of \$1000 per worker for companies that employ above the median number of employees, and has a flexible general plan that allows for low cost development and repurposing of lands contingent on need. Dublin offers fee deferral for building users, allowing them to finance their building fees through a bond, whereby the fees to become an operating expense. It also offers a sales tax reimbursement for companies with taxable products, providing a sales tax refund for up to 10 years in exchange for business and cash flow into the area.

Low Business License Fees

Tri-Valley has extremely low business license fees. In San Ramon, for example, fees max out at \$350 annually, even for Chevron, and Dublin's license fees are even lower at \$50. This can mean millions of dollars a year in savings simply on fees for companies moving from an urban region such as San Francisco.

Flexible Service and Business Outreach

Local governments are quite supportive and accommodating to businesses in the area. For example, Dublin was able to process TRIA Beauty in two weeks when it expressed a desire to move to the area, allowing them to transition their operations almost seamlessly. Dublin also operates a business outreach program in which it meets with local businesses to find out what it can do to encourage them to stay, and attract similar businesses to the area.

Redevelopment Agencies

Responsible for delivering building improvements to enhance attractiveness of the region and create more available commercial space.

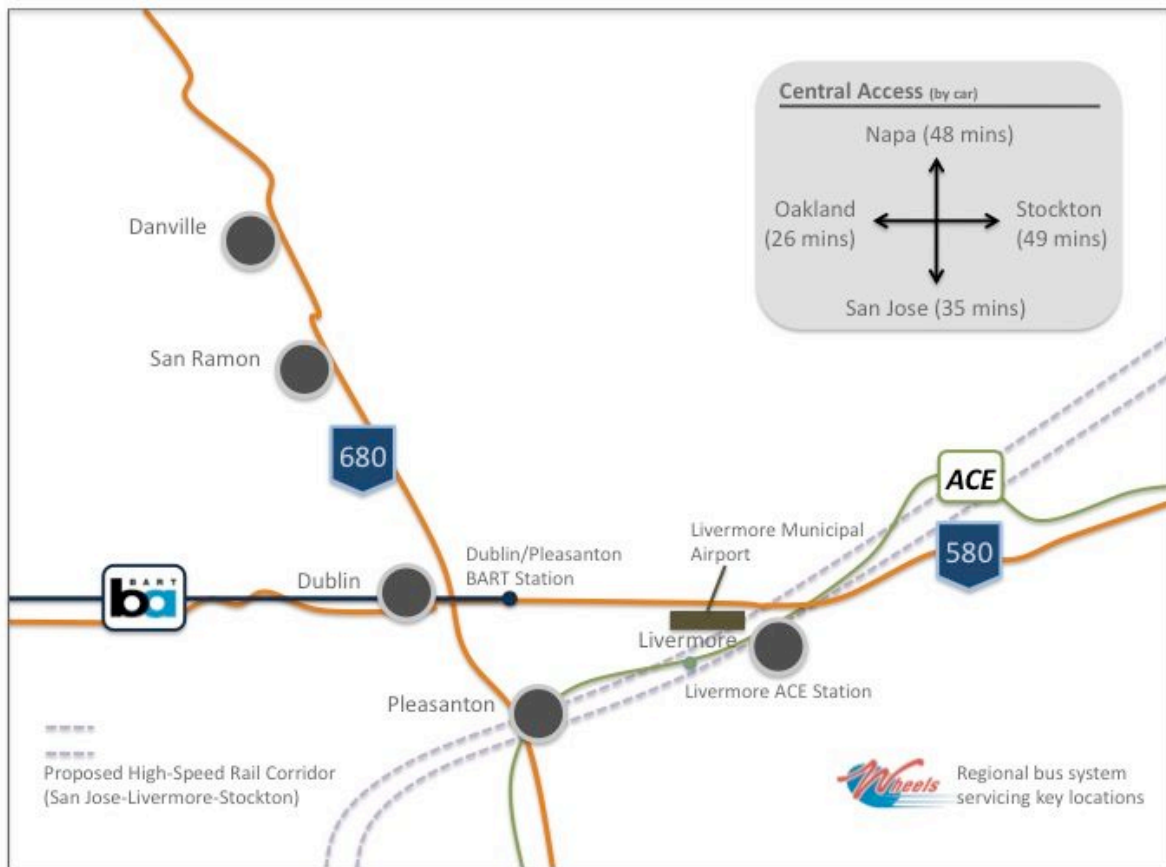
⁴⁹ Interviews with the five Economic Development Directors

Key Element 7: Quality of Life

Innovators, entrepreneurs, investors, engineers and the many others, who contribute to the success of a company all appreciate, enjoy and often demand a high quality of life for themselves and their families. Good schools and easy access to recreational opportunities and cultural venues are important factors for defining the quality of life in a region. The importance of the regions quality of life is not to be overlooked: It ranks as a key element of the region’s innovation ecosystem.

Transportation

Figure 5 – Tri-Valley Transportation



The Tri-Valley region enjoys a location at the center of a number of key regional areas: San Francisco and Oakland, San Jose, Stockton and Napa. It is intersected by the 580 and 680 interstate routes, which form a junction at Dublin/Pleasanton. The junction is a mixed blessing, with traffic bottlenecking on the 580 during peak hours, creating an impediment to easy commuting and client visitation. Available alternatives such as bus, rail and air currently provide limited relief, although the Livermore Municipal Airport does not have the flight routes to make it a significant transportation asset.⁵⁰ The Dublin/Pleasanton BART connection is a highly valuable asset as it provides access to the city and the airport, and plans are underway to extend

⁵⁰ Tri-Valley city websites

the line to Livermore. Livermore is also being considered as a potential stop along the high-speed rail corridor.⁵¹

Mediterranean Climate

The region’s climate has mild, moderately wet winters and dry summers. It is strongly influenced by the cooling currents of the Pacific Ocean, which tend to moderate temperature swings and produce a remarkably mild climate with little seasonal temperature variation. Due to its sharp topography and maritime influences, the region exhibits several microclimates.⁵²

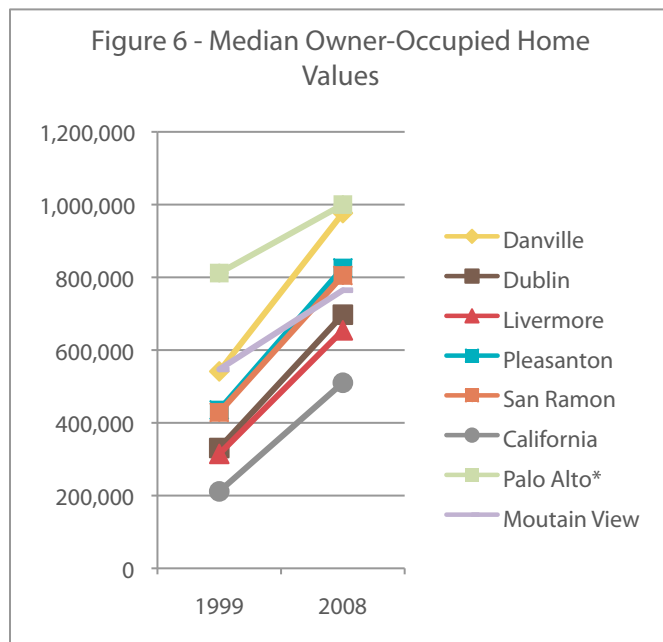
Quality Living Environment

Location matters, even in the footloose digital age. It matters a great deal because knowledge workers of the region are a fairly sophisticated bunch. They value access to universities as well as quality schools for their kids. They appreciate cultural richness and civic virtue. They expect choice in housing and transportation, diversity of employment opportunities, a good physical environment, good food, and good coffee (an important fuel for the innovation economy).

Affordable Housing

In 2005 the Preserving Prosperity Project commissioned by the Tri-Valley Business Council reported that only 13% of the population could afford to purchase the median-priced home in Alameda County, and that claimed that a household would still have to make \$112,000 in order to qualify for the Tri-Valley median priced home at \$480,000. The concern was that this would provide a barrier to entry to new high-level talent and mid-level talent, not to mention public service and service industry workers critical to maintaining a stable community ecosystem.⁵³

With only 12% of occupied Tri-Valley homes valued at less that \$500,000 in 2008, affordable housing is still a clear challenge to establishing a balanced



*Palo Alto’s median value exceeds \$1 million, but a precise amount is not available

⁵¹ <http://www.cahighspeedrail.ca.gov/>, Interview with Rob White, Economic Development Director, City of Livermore

⁵² <http://www.Tri-Valleycvb.com>

⁵³ July 2005 Preserving Prosperity Project report: “Wellspring for Entrepreneurship and Innovation – The Changing Economic Role and Responsibilities of the Tri-Valley Region”

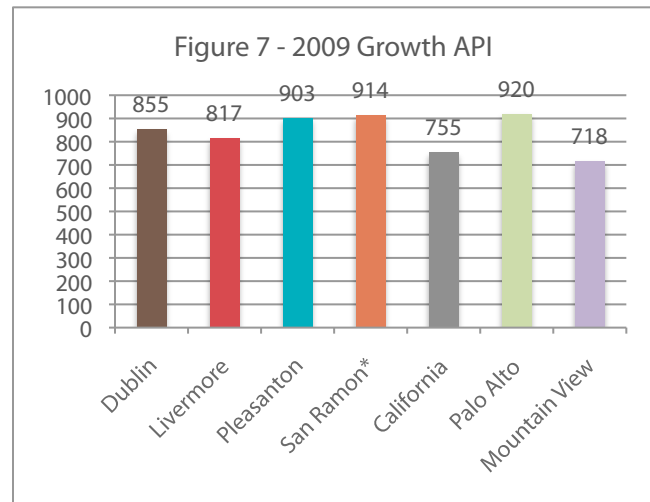
community in the region that can support and sustain innovation.⁵⁴

However, there are encouraging signs in this area, including:

- A significant rise in the percentage of the Alameda County population that can afford to purchase an entry-level median priced home, now at 58% in Q4 of 2009⁵⁵
- A drop in the minimum qualifying income in Alameda County for purchase of an entry level home, at \$68,400 in Q4 of 2009⁵⁶
- Concerted efforts on the part of each of the city governments to develop and make available more affordable housing through a variety of programs such as rezoning, redevelopment, financing and information sharing⁵⁷

Award-Winning, Highly Rated Public Schools⁵⁸

The Tri-Valley region is served by four award-winning public school districts (Pleasanton Unified School District, San Ramon Valley Unified School District, Dublin Unified School District, Livermore Valley Joint Unified School District) with over 60,000 K-12 students enrolled. Tri-Valley schools exceed the average state scores on the Growth Academic Performance Index, California’s metric for measuring school performance, and two of the districts are comparable to those of Palo Alto (Figure 7).



School district achievements include:

- Numerous state and federal accolades for the region’s schools, including California Distinguished School,
- National Blue Ribbon School and National School of Character
- High rates of college or vocational school attendance by graduating seniors, including 94% in San Ramon and 90% in Pleasanton
- Well-educated and highly qualified teacher base
- High level of parental involvement

Growth API
 The Growth Academic Performance Index is based on an assessment of standardized test scores and is used by the California State Government as a standard for rating school district performance.

⁵⁴ US Census Bureau

⁵⁵ California Association of Realtors

⁵⁶ Ibid.

⁵⁷ Interviews with the five Economic Development Directors

⁵⁸ Pleasanton Unified School District, San Ramon Valley Unified School District, Dublin Unified School District, Livermore Valley Joint Unified School District websites

Health Care

*ValleyCare Health System*⁵⁹

ValleyCare Health System is an intricate part of the Tri-Valley and surrounding communities, and has provided state-of-the-art, top quality health care to local families since 1961. As a not-for-profit health system, with facilities in both Livermore and Pleasanton, ValleyCare Health System reinvests any profit it makes into the organization for new technology, facilities and services. Being locally owned, no profits or dividends go to a parent company outside of the area and it is not supported by taxes. ValleyCare has a total of 242 beds and a medical staff of over 300, offering a wide array of inpatient and outpatient services that are at a world-class level.

*San Ramon Regional Medical Center*⁶⁰

San Ramon Regional Medical Center is a 123-bed acute-care hospital, serving the community since 1990.

SRRMC is known for its advanced inpatient, outpatient and emergency services, including minimally invasive surgical technology. It offers many other quality medical services, such as cardiac care, cancer care, orthopedics, pediatrics, a Family Birthing Center, and a Blood Conservation Program.

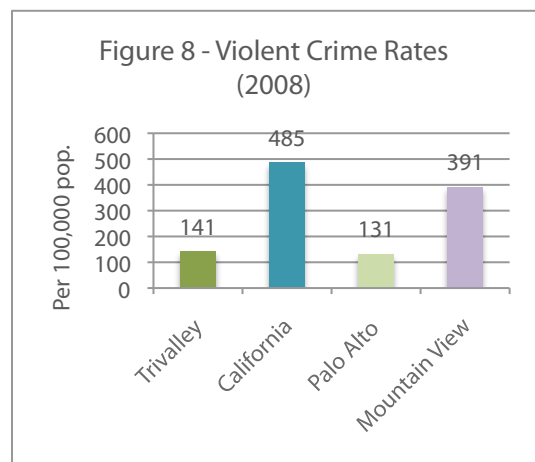
*Kaiser Permanente Facilities*⁶¹

Kaiser Permanente has medical offices in both Livermore and Pleasanton providing a full range of low to mid level medical services.

Public Safety

Safety-Committed Community

The communities of the Tri-Valley region are all serviced by local, well-staffed police and fire departments. Communities also have contingency plans developed for a variety of emergency scenarios, and educational resources made available for their residents. Additional public safety initiatives include StreetSmarts, a regional public education campaign to raise awareness of traffic safety-related issues.⁶²



⁵⁹ www.valleycare.com

⁶⁰ www.sanramonmedctr.com

⁶¹ <https://www.kaiserpermanente.org>

⁶² Tri-Valley city websites

Low-Crime Region

As Figure 8 indicates, the Tri-Valley Region has a rate of violent crime that is 3.4 times lower than that of the State of California.⁶³

Water Quality and Resources

Water is supplied to the Tri-Valley region by the Zone 7 Water Agency, and distributed by several organizations, including the East Bay Municipal Utility District, the Dublin San Ramon Services District, Livermore Municipal Water, and City of Pleasanton Water Division. Water to the region is supplied from multiple sources, including Lake Del Valle and the Byron Bethany Irrigation District, and local groundwater sources. This diversity is one indicator of a healthy, stable system, and supplies and water quality are reported to be in good shape.⁶⁴

Municipal governments also supplement this system with recycling efforts and conservation policies that help address the continuing four-year drought that California as a whole has been facing.⁶⁵

Diversified Utilities

PG&E is the main supplier of electricity and natural gas to the region. It uses three substations to ensure stable coverage and minimize the risk of outage, a key concern for businesses operating in the region. A Federal Substation also serves as an additional source of power.⁶⁶

There has also been significant investment into solar and wind in the region, with the municipal governments responsible for multiple efforts to supplement traditional power sources with natural sources. One example is the Solar Cities Program operating in Livermore, Pleasanton and Dublin, which is focused on educating and advising residents on the benefits of solar energy.⁶⁷ Livermore boasts the largest cinema complex solar unit installation in the world, which offsets 45% of its electricity use.⁶⁸

⁶³ US Dept. of Justice/FBI CUIS Report 2008, State of California Criminal Justice Statistics Center

⁶⁴ www.ebmud.com, www.dsrsd.com, www.ci.livermore.ca.us/wrd/faqs.html,
www.ci.pleasanton.ca.us/services/utility/water-system.html

⁶⁵ Tri-Valley city websites

⁶⁶ Ibid.

⁶⁷ <http://www.solarcitiesnow.com>

⁶⁸ <http://www.renewableenergyworld.com/rea/partner/spg-solar-inc/news/article/2009/04/spg-solar-completes-the-largest-cinema-rooftop-solar-installation>, Interview with Rob White, Economic Development Director, City of Livermore

Recreation & Entertainment⁶⁹*Ideal Blend of Historic Charm and Modern Convenience*

Each of the five municipalities feature charming, historic downtown areas that are pedestrian-friendly and filled with charming local restaurants and unique boutique shopping experiences. They boast a large number of parks and recreational spaces, as well as sophisticated contemporary shopping locations.

⁶⁹ <http://www.Tri-Valleycvb.com>

Wine Country

Livermore Valley Wine Country is one of California's oldest wine regions, with 40-plus wineries dotting the picturesque valley. Many of the wineries, including Wente Vineyards and Concannon Vineyard, feature local tasting rooms and participate in the annual Livermore Valley Harvest Wine Celebration.

Golf

With the LPGA Tour choosing Tri-Valley as one of its Nationwide Tournament hosts, Tri-Valley golf scene is officially on the map. All five cities have driving ranges and a large choice of public and private clubs. Courses of note include the Greg Norman designed Course at Wente Vineyard, the Poppy Ridge Golf Course, and the area's newest course at Callippe Preserve. Additional golf courses include: Diablo Country Club, Castelwood, Ruby Hill, Bridges Golf Course, Dublin Ranch Golf Course, Las Positas Golf Course.

A Foodie's Paradise

From locally grown produce available at farmers markets to a full spectrum of ethnic and regional cuisines, the Tri-Valley region offers the best in culinary experiences. From a casual lunch to an elegant meal, from fusion to pub food, it is all to be found in Tri-Valley.

The Great Outdoors

The East Bay Regional Park system, spanning 96,000 acres across Alameda and Contra Costa Counties, provides over 65 parks and 29 regional inter-park trails. Boating, swimming, windsurfing and fishing are a stone's throw away at Shadow Cliffs Park in Pleasanton, and Del Valle Park in Livermore. There are excellent hiking, horse riding and off-road cycling opportunities, from a gentle stroll through Sycamore Grove in Livermore, to a hike through the wilderness at Sunol Regional Park.

Arts, Culture, Events

Tri-Valley, California has a thriving art scene that grows bigger and more diverse each year. The cities of Tri-Valley have a large selection of private galleries and art associations as well as an active performing arts scene, from Shakespeare in the Vineyards to Opera to free concerts in the park.

Cultural Venues include: Wente Vineyards Amphitheatre, Las Positas College Theatres (indoor and outdoors), Amador Theatre, Bankhead Theatre, Firehouse Arts Center, Dougherty Performing Arts Center, San Ramon Theatre, Concannon Shakespeare Outdoor Theatre, Bothwell Arts Center, Tri-Valley Rep Black Box Theatre, Retzlaff Outdoor Comedy Center, Front Row Theatre (Danville), Tao House, Dublin High School Performing Arts Center, etc.

Community and Event Centers include: Alameda County Fairgrounds, Diablo Country Club, Castlewood Country Club, Pleasanton Senior Center, Robert Livermore Community Center,

Dublin Senior Center, Casa Real Event Center, Palm Event Center, Wente Vineyards, Aahmes Center, Ruby Hill Country Club, Callippe Golf Course, San Ramon Golf Club, The Clubhouse at Las Positas, etc.

Museums include: Blackhawk Auto Museum, Pleasanton History Museum, Carnegie History Museum, Dublin Heritage Center, Arlen Ness Museum (motorcycles) Sunol Water Temple.

Benchmarking

Benchmarking

While a detailed inventory of a region's assets is critical to any improvement efforts, the context and learnings that come from a study of other successful regions are equally integral. By assessing the development of other regions, the Tri-Valley can potentially borrow best practices and avoid common pitfalls. For the purposes of this report, four hi-tech regions across the country were selected. Variety was the key principle guiding the selection of these regions. Each comes from a unique geography, culture and history, and provides a unique perspective on approaches to creating a successful innovation center from various assets. The regions are the Nashville region of Tennessee, the Research Triangle of North Carolina, San Diego, California, and Austin, Texas.

Tennessee and the Nashville Region⁷⁰

Overview of Tennessee's Tech Initiatives

Tennessee has a mixed history of success in developing its innovation economy. In 1997, the state government took the initiative to form The Tennessee Development Corporation (TTDC) as a non-profit organization charged with “identifying science and technology related issues in Tennessee, developing its innovation economy.” Unfortunately, this initiative proved to be relatively ineffective.

Almost a decade later in 2006, the state commissioned a comprehensive assessment of the state's economy with the goal of developing effective strategies for economic development. The assessment included a detailed SWOT analysis and a regional competitive analysis as well as the Tennessee Innovation Initiative Survey that gathered opinions, ideas and recommendations from over 700 of the state's business, civic and academic leaders and analysis on how to foster the growth of the state's economy.

The resulting report called the Tennessee Innovation Road Map was released in 2006. The Road Map provided a point-by-point pathway for stimulating and supporting the state's emerging technology sectors. Recommendations included the formation of a new public-private organization dubbed Innovation Tennessee with a broader charter, a stronger foundation, and a clearer path forward.⁷¹ One of the key findings of the study was the need for Tennessee to capitalize on its strengths in the healthcare and biotechnology sectors.

Figure 1 – Business Incubators in Tennessee



Source: Google Maps

At the same time, the report noted that Tennessee has "a shortage of entrepreneurial-minded people and an absence of an 'entrepreneurial culture'," with the State's "current culture... viewed as parochial and conservative."⁷² The reports described the TTDC and the Tennessee Biotechnology Association as “inadequate to the challenges facing Tennessee.”⁷³ Tennessee's *New Economy Index 2007* noted that the state ranked 36th in digital infrastructure and use of the Internet and 43rd in “overall capacity for innovation.” Innovation and economic development is

⁷⁰ <http://www.rtp.org/main/>

⁷¹ <http://www.state.tn.us/ecd/pdf/FinalTIRM.pdf>

⁷² http://www.nashvillepost.com/news/2007/3/30/report_parochialism_hampers_tennessee_economic_development

⁷³ *Ibid.*

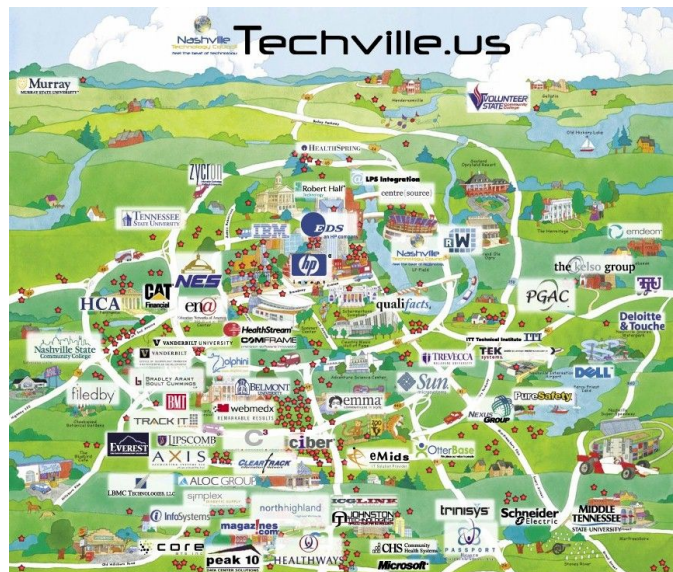
driven by visionary inventors, scientists and engineers. According to the Index report, Tennessee ranked 31st among the states in the number of scientists and engineers in the workforce.⁷⁴

Another recommendation of the Tennessee Innovation Road Map report pointed out the critical need to improve technology transfer from the Oak Ridge National Laboratory, located in and the region's universities to private sector start-ups. Oak Ridge, near Knoxville, is the U.S. Dept. of Energy's largest science and energy lab and a world-class research facility specializing in nuclear science. In response, Tennessee's governor allocated funds to recruit and support accomplished researchers who are given joint appointments ("Chairs") at the University of Tennessee (UT) and Oak Ridge National Laboratory (ORNL). The Governor's Chair program provides \$8 million for a biological sciences building at ORNL, the creation of a Center of Excellence and funds 17 Chairs. This initiative is intended to position Tennessee as "a national leader in the production of ethanol from cellulosic biomass."⁷⁵ The 2008 State Bioscience Initiatives report notes that Tennessee has now committed \$72 million over five years to the UT Biofuels Research Initiative. This initiative supports biofuels research and provides funds to construct a pilot biofuels production plant.⁷⁶

Overview of Nashville's Tech Economy

The Nashville region has been more successful than the state in fostering the growth of an industry cluster and building an innovation economy. While Nashville is known worldwide as the "home of country music," healthcare and medical sciences have evolved as core industries of the region's economy. Nashville's healthcare industry has become the region's largest employer and several of the nation's major industry segments were born in Nashville including hospital management, disease management, independent outpatient surgery centers and physician practice management groups.⁷⁷ Since the 1960s, over 300 health care companies (17 of which are publicly traded) have located in the Nashville area – these companies account for over \$80 billion in annual revenue.⁷⁸ The economic contribution from this sector to the Nashville area has been estimated to be over \$20 billion.⁷⁹

Figure 2 – Nashville's Technology Cluster



Source: Techville.us, Nashville Technology Council

⁷⁴ http://www.nashvillepost.com/news/2007/3/30/report_parochialism_hampers_tennessee_economic_development

⁷⁵ http://www.bio.org/local/battelle2008/TN_BIO_08.pdf

⁷⁶ Ibid

⁷⁷ http://www.healthcarecouncil.com/index.php?option=com_content&task=view&id=2&Itemid=10

⁷⁸ <http://nashville.medicalnewsinc.com/nashville-health-care-council-s-new-family-tree-illustrates-year-of-continued-development-in-health-care-industry-cms-2286>

⁷⁹ <http://nashville.medicalnewsinc.com/news.php?viewStory=1724>

Key players in the development of Nashville's healthcare management cluster were Hospital Corporation of America⁸⁰ (HCA) and Vanderbilt University's Vanderbilt Center for Better Health. Nashville's Health Care Council also played a key role in supporting the region's healthcare industry. The Council's membership includes over 175 organizations representing regional and national healthcare companies and professional services firms. Each year since 1998, the Council publishes the Health Care Industry Family Tree, a visual representation and directory of the almost 600 businesses and organizations that make up Nashville's healthcare industry cluster. As a marketing and branding tool, the Family Tree has proven to be a very useful tool in helping stakeholders in the region's economy see and understand the growing depth and breadth of the cluster and appreciate the interdependence among organizations.

Key Success Factor: A well-orchestrated effort to capitalize on and aggressively promote Nashville's strong suit: healthcare services via a well-managed non-profit business association.

Clearly the trunk of Nashville's healthcare family tree is HCA, one of the nation's leading providers of healthcare services with 2008 revenues of over \$28 billion.⁸¹ Founded in 1968, HCA has been the source of numerous spin-offs that have taken root in the Nashville area. As HCA blazed new trails and created new markets, talented HCA administrators took the initiative to form new companies. Here is a sample of the long and impressive history of the successful healthcare spin-offs and start-ups stemming from HCA alone:⁸²

- HCA spun off HealthTrust in 1987 and subsequently bought HealthTrust back in 1995.
- HealthTrust's former Chairman and CEO Clayton McWhorter formed Clayton Associates in 1996 to invest in the region's healthcare sector.
- HealthTrust's former president and chief operating officer, Charles N. Martin, Jr., bought hospital chain Republic Health, created OrNda Healthcare Corp. and later sold it for \$1.8 billion. Martin soon thereafter founded Vanguard Health Systems as well as a number of start-ups including Vger Technologies, Health Connections, Symbion ARC, Trinity Medicare and NetContent.
- Former HCA member David White founded the hospital chain Iasis Healthcare in 1999 then sold it to Texas Pacific Group for \$1.4 billion.
- Former HCA division president Joey Jacobs founded Psychiatric Solutions, a successful behavioral health company.
- Quorum Health Group, HCA's hospital management company, was spun off in 1991 led by former HCA executive Jim Dalton
- Both Triad Hospitals and LifePoint were spun off from HCA. LifePoint is run by former HCA executive Ken Donahey

⁸⁰ Another pioneering Nashville healthcare firm, Health Affiliates, Inc., merged with HCA in 1981.

⁸¹ <http://www.hcahealthcare.com/CPM/CurrentFactSheet1.pdf>

⁸² http://www.healthcarecouncil.com/index.php?option=com_content&task=view&id=3&Itemid=12

- Hud Connery, former CFO of HealthTrust, launched Arcon Healthcare and went on to form hospital chain Essent Healthcare in 1999.

Key Success Factors: A culture of innovation and entrepreneurship established by a small number of key players and organizations then encouraged and nurtured over the years as a key economic development strategy to build on the region's historical successes and established core industry strengths.

Key Elements of Nashville's Innovation Ecosystem

Research, Ideas, Innovations, Tech Transfer

- In 2009, Vanderbilt University was ranked 15th nationwide as a research-oriented medical school⁸³ (39th as a graduate engineering school).⁸⁴ The university includes the Owen Graduate School of Management along with a School of Engineering and a School of Medicine. Research is one of Vanderbilt University Medical Center's core missions. The Center's Office of Research provides information and comprehensive services that assist faculty in their efforts to secure funding and conduct research.⁸⁵
- Middle Tennessee State University, located 30 miles outside of Nashville in Murfreesboro, is a full-sized public university with Tennessee's largest undergraduate population. MTSU includes a College of Engineering & Technology offering advanced degree programs in Engineering and Computer and Information Systems Engineering, and a College of Health Sciences offering advanced degrees in Physical Therapy and Speech and Hearing Sciences. The university's sponsored research budget was over \$32 million in 2006.⁸⁶

Entrepreneurs

- Numerous former HCA executives have founded very successful companies that have created significant wealth for their founders. Many have become serial entrepreneurs by reinvesting in new start-ups in the region. These entrepreneurs have been highly influential in establishing Nashville's culture of innovation and entrepreneurship.
- The Nashville Business Incubation Center (NBIC) was founded in 1986 as a joint project of the Tennessee Valley Authority (TVA) and Tennessee State University to support entrepreneurs in launching and growing their businesses. NBIC is currently operated by Tennessee State University's College of Business.⁸⁷ NBIC was launched with a grant of \$1,050,000 from TVA for the construction of the original 18,000 square-foot facility. This grant also provided operating funds for the first six years. In 1994, the state's Economic

⁸³ <http://colleges.usnews.rankingsandreviews.com/best-colleges/national-universities-rankings>

⁸⁴ <http://www.vanderbilt.edu/>

⁸⁵ <http://www.vanderbilt.edu/oor/>

⁸⁶ <http://www.tnstate.edu/interior.asp?mid=903&ptid=1>

⁸⁷ <http://www.nbiconline.com/>

Development Administration contributed \$1.4 million for physical expansion of the facility to 39,000 square-feet – enough space to house 22 tenant businesses.⁸⁸

- The Nashville Technology Council sponsors several initiatives to foster the development of next generation entrepreneurs. NTC’s FirstCamp Nashville is “*an education ‘unconference’ designed to engage high school students with the technology community by allowing them to present and discuss their ideas.*”⁸⁹ MTSU also offers several tech-oriented summer camp programs for teens.⁹⁰

Investment Capital

Venture Capital

- Ten of Tennessee’s top 15 venture capital firms are headquartered in Nashville.⁹¹
- VC investments in Tennessee ventures have declined over the last several years from \$124 million in 2007 to \$74 million in 2008 and \$49 million in 2009 (a low years for VC investing in general). 2007’s total was high due to the unusually high value of investments (\$77 million) in Q4.

Angel Investors

- The Nashville Capital Network (NCN) is a collaborative initiative of Vanderbilt University, the Nashville Technology Council, Nashville Health Care Council and the Nashville Area Chamber of Commerce. NCN connects Angel Investors with entrepreneurs, to help businesses raise early stage capital, grow, and prosper.⁹² NCN’s membership includes 75 angel investors.⁹³

Seed Funds

- The Nashville Capital Network manages the \$5.2 million NCN Angel Fund – a “sidecar fund” for making co-investments.⁹⁴ Since its inception, NCN is directly responsible for investing \$17.8 million in transactions totaling \$40 million.

Workforce

- Two of the top three counties in the state with the highest percentages of adults with an advanced degree are in the greater Nashville region. Williamson County (170,000 residents), part of the Nashville-Davidson–Murfreesboro–Franklin Metropolitan Statistical Area, ranked first at 16.7%. Davidson County (630,000 residents), within which Nashville is located, ranks third at 11.7%.

⁸⁸ http://www.tnstate.edu/oibp_archive/Nashville%20Business%20Incubation%20Center.htm

⁸⁹ <http://www.technologycouncil.com/2010/04/12/firstcamp-for-high-school-students/>

⁹⁰ <http://www.technologycouncil.com/2010/04/07/summer-camp-for-teens-technology-style/>

⁹¹ http://www.decosimo.com/downloads/tn_venture_capital.pdf

⁹² <http://www.angel-investor-network.com/Nashville-Capital-Network.html>

⁹³ http://www.nashvillecapital.com/photos/NCN_Winter_2010_Newsletter.pdf

⁹⁴ <http://www.nashvillecapital.com/news.php?viewStory=107>

- Williamson County is listed 17th on the Forbes 2010 list of the 25 wealthiest counties in America.
- A 2008 survey of the region's workforce by the Nashville Area Chamber of Commerce in conjunction with the Nashville Career Advancement Center and the Tennessee Department of Labor and Workforce Development, found that nearly 21% of total regional employment is due to proprietorships. According to this report, this is much higher than most other U.S. metro areas.⁹⁵ This report also found that *"the [region's] educational system is not meeting the existing and projected demand include a number of technical, information technological, and engineering occupations, various management jobs, industrial engineers, post secondary and secondary school teachers — particularly for STEM disciplines."*⁹⁶

Social and Professional Networks

- The Nashville Technology Council is an active agent in promoting and supporting the region's tech economy. NTC offers numerous networking events, workforce training initiatives and "provides a common voice for technology trends, issues, and opportunities in [the] region, state, and nation."⁹⁷ NTC is also an important link between the region's technology and investor communities.
- The Nashville Health Care Council is also an important agent in promoting the continued growth of Nashville's health care industry. The Council offers educational programs, networking and mentoring activities. The Council sponsors various international initiatives to promote business opportunities for Council members abroad and to "further raise the profile of Nashville's health care industry internationally."⁹⁸
- The Tennessee Biotechnology Association (TBA) is headquartered in Nashville. TBA is "a statewide organization of leading scientists, researchers, academicians, clinicians, legislators and business professionals working to foster, develop and support the life sciences in Tennessee."⁹⁹

Business Environment

- In 2009, MarketWatch ranked Nashville 15th in its annual "Best Cities for Business" survey – a tie with Raleigh, North Carolina, home of the Research Triangle Park and hub of the Research Triangle Region.
- Nashville's healthcare industry is supported by more than 250 professional service firms (e.g., accounting, architecture, banking, legal) with expertise in the healthcare industry.¹⁰⁰

⁹⁵ http://www.goldworks-discount.com/business/workforce/executive_highlights.pdf

⁹⁶ <http://www.goldworks-discount.com/workforcestudy/>

⁹⁷ <http://www.technologycouncil.com/membership/membership/>

⁹⁸ http://www.healthcarecouncil.com/index.php?option=com_content&task=view&id=11&Itemid=21

⁹⁹ <http://www.tnbio.org/index.cfm>

¹⁰⁰ http://www.healthcarecouncil.com/index.php?option=com_content&task=view&id=2&Itemid=11

Quality of Life

- The downtown area of Nashville features a diverse assortment of entertainment, dining, cultural and architectural attractions. Nashville is known for music – the city boasts a vibrant music and entertainment scene. The Tennessee Performing Arts Center is the major performing arts center of the city. It is the home of the Tennessee Repertory Theatre, the Nashville Opera, and Nashville Ballet. In September 2006, the Schermerhorn Symphony Center opened as the home of the Nashville Symphony Orchestra. Vanderbilt University is also a hub of cultural life in the city.¹⁰¹
- Nashville’s climate is described as humid subtropical. Weather in the spring and fall are generally pleasant, but the region is prone to severe thunderstorms and occasional tornadoes. Nashville is ranked as the 18th-worst spring allergy city in the U.S. by the Asthma and Allergy Foundation of America.¹⁰²

¹⁰¹ http://en.wikipedia.org/wiki/Nashville,_Tennessee

¹⁰² *Ibid.*

North Carolina's Research Triangle Region¹⁰³

Overview

Just as the founding of the Stanford Industrial Park in 1951 played a pivotal role in the evolution of today's Silicon Valley, so too was the creation of the Research Triangle Park (RTP) in 1959 a catalytic event in the creation of what is now known as the Research Triangle Region of central North Carolina - one of the top innovation regions in the U.S. (See Figure 1) And, like the process that led to the creation of the Stanford Industrial Park, the development of RTP was an idea launched and carried to fruition of a handful of visionary leaders including Howard Odum, a sociology professor at the University of North Carolina at Chapel Hill, Romeo Guest, co-owner of a major contracting business in the region, and a key investor: Karl Robbins.¹⁰⁴

Figure 1 - Counties contained in the Research Triangle

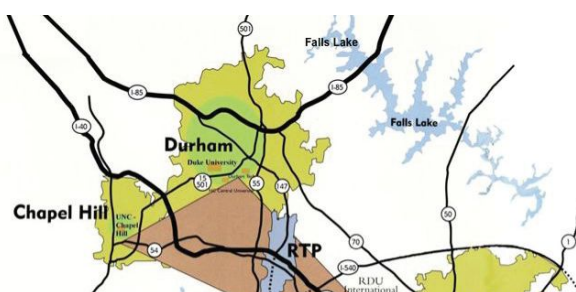


■ Three core counties: Wake, Durham, Orange
 ■ Raleigh-Durham-Cary Combined Statistical Area, per the U.S. Census Bureau

Key Success Factor # 1: Visionary leaders with complementary backgrounds, abilities and resources

Leveraging their complementary talents, resources and connections, these three men helped form the Research Triangle Committee in 1956. In 1957, Robbins acquired the options on the 7,000 acre park site.¹⁰⁵ The Committee formed a for-profit company with Robbins as the sole shareholder. The plan was to sell shares in a newly-formed venture called "Pinelands" that would develop the Park. Later, in 1958, the Committee opted to change its business model by becoming a non-profit foundation (the Research Triangle Foundation). Rather than sell stock in Pinelands, the Committee launched an aggressive campaign to solicit contributions toward the development of the Park. By early 1959, the Foundation had raised over \$1.4 million to acquire the Park's land from Robbins and to construct and create the Research Triangle Institute (RTI). RTI is now the fourth-largest non-profit contract research organization in the U.S. with expertise in a wide range of fields.¹⁰⁶ (See Figure 2)

Figure 2 - The Research Triangle Park



¹⁰³ <http://www.rtp.org/main/>

¹⁰⁴ <http://www.chrisedwardsgroup.com/city-tours/triangle-park.aspx>

¹⁰⁵ At 7,000 acres, the Research Triangle Park is ten times larger than the Stanford Industrial Park (700 acres).

¹⁰⁶ <http://www.chrisedwardsgroup.com/city-tours/triangle-park.aspx>

Key Success Factor # 2: A single well-financed organization focused on and empowered to manifest the vision

With the Institute as the Park's first tenant, the Park began to grow. But it took several years before the Park's real momentum began to build. In 1965, IBM and the National Institute of Environmental Health Sciences both established facilities in the Park. IBM's facility at the Park is now one of the company's largest and employs roughly 11,000 persons.¹⁰⁷ By 1969, 21 companies were tenants of the Park. Seventeen more businesses located in the Park during the 70s and 28 more joined in the 80s.¹⁰⁸ In 1971, Burroughs Wellcome (later to become part of GlaxoSmithKline) opens a research facility in the Park. Later, in 1983, Glaxo Inc. moves to a new research facility. The Park now serves as the U.S. co-headquarters for GlaxoSmithKline, one of the world's largest pharmaceutical companies, and is home for one of Glaxo's largest R&D facilities (roughly 5,000 employees).

Parallel to growth of the Park, the state's legislature established the North Carolina Biotechnology Center dedicated to developing the state's biotech industry in response to a year-long study that examined ways for the state to capitalize on the emerging field of biotechnology. The legislature opted to establish the Center in the Research Triangle Park. The Biotechnology Center "is not a site for laboratory research or company incubation. Instead, it works to strengthen the research capabilities of North Carolina's companies and universities." In FY 2007-08, the Center received \$15.6 million in funding from the state.¹⁰⁹ Also located in the Park is MCNC, an independent, non-profit organization that "employs advanced networking technologies and systems to continuously improve learning and collaboration throughout North Carolina's K20 education community." MCNC was initially funded by the state in 1980 in order to stimulate technology-based economic development.

Today, over 170 companies and organizations are located in the Research Triangle Park ranging from major multi-national companies with thousands of employees (e.g. Cisco Systems, NetApp, and Sony Ericsson) to 1-2 person start-up companies.¹¹⁰ More than 30% of the Park's companies have "substantial global operations."¹¹¹ Technology clusters within the Park include information/communications technology, biotechnology and life sciences, and environmental sciences. In addition, numerous state and federal agencies are also located in the Park, including the General Services Administration Defense Logistics Information Service, and the U.S. Environmental Protection Agency. The Park has also attracted non-tech companies and organizations including the Bank of America, the Motor & Equipment Manufacturers Association, and the University of North Carolina's Center for Public Television.¹¹²

Key Success Factor #3: Large anchor tenants, both public and private sector, with complementary specialties (e.g. biotechnology), synergistic relationships and global operations.

¹⁰⁷ http://en.wikipedia.org/wiki/Research_Triangle_Park

¹⁰⁸ <http://www.chrisedwardsgroup.com/city-tours/triangle-park.aspx>

¹⁰⁹ http://www.ncbiotech.org/about_us/index.html

¹¹⁰ <http://www.encyclopedia.com/doc/1P1-113776082.html>

¹¹¹ <http://www.rtp.org/main/index.php?pid=234&sec=1>

¹¹² http://www.rtp.org/files/Maps/2008_rtp_map_alpha_081408.pdf

Within the Park there is a concerted effort to foster the growth of start-up companies through several business incubators. These incubators are the source of future Park resident companies and a foundation for the region's future economic prosperity.¹¹³

- The First Flight Venture Center (FFVC) is a technology incubator located in the heart of Research Triangle Park. The incubator was established in 1991 specifically to serve the initial needs of entrepreneurs and early stage companies in the Research Triangle area. FFVC offers 16,000 square feet of leasable office and laboratory space for up to 25 emerging technology companies.¹¹⁴
- The BD BioVenture Center provides early-stage companies access to a world-class bioresearch infrastructure that includes state-of-the-art laboratory equipment, as well as the opportunity to connect with BD business leaders and scientists from around the world. Fueled by these resources and venture capital funding, high-potential biotech companies have from six months to two years to "incubate" and evolve into full-fledged businesses. Fifteen companies have participated in the BD BioVenture Center program to date, creating over 400 high-quality biotech jobs in the region and raising more than \$400 million in corporate, government and venture funding.¹¹⁵
- The Hamner Accelerator Facility provides an integrated systems biology platform for the development of early-stage biotechnology and pharmaceutical start-up companies. Seamlessly integrated with two world-class institutes in translational biomedical sciences and toxicology/safety assessment, The Hamner Accelerator houses state-of-the-art facilities supporting health outcomes-based systems biology programs.¹¹⁶
- The proposed Carolina Innovation Center will provide an environment where innovation-based companies affiliated with the University will work to accelerate their research and development from laboratory concept to viable business. The Innovation Center will be funded, built and operated by a private developer, Alexandria Real Estate Equities, Inc., in partnership with the University of North Carolina.¹¹⁷

Key Success Factor #4: Multi-faceted strategies designed to support the formation of new companies and access to capital, expertise and specialized equipment to help them grow

As the Park continued to grow and evolve as a hub for high-tech research and business development, the surrounding area began to attract other high-tech companies and enterprises, too – thus the phrase “the Research Triangle Region” (or simply “The Triangle”) came to refer to the eight-county region that includes the Raleigh-Cary and Durham-Chapell Hill metropolitan areas.¹¹⁸ Some definitions of The Triangle also include five surrounding counties. According to the U.S. Census, The Triangle's population was over 1,700,000 in 2009.

¹¹³ Incubator descriptions from the respective websites

¹¹⁴ http://www.ffvcnc.org/center_information.cfm

¹¹⁵ <http://www.bd.com/technologies/bvc/rtp/index.asp>

¹¹⁶ <http://www.thehamner.org/technology-and-development/accelerator.html>

¹¹⁷ <http://research.unc.edu/cn/InnovationCenter.php>

¹¹⁸ Raleigh: pop. 380,000; Durham: 217,000; Chapel Hill: 54,500

Research Triangle Park along with North Carolina University's Centennial Campus in Raleigh, have had a profound and positive effect on the entire region. Active technology transfer programs at Duke University and the University of North Carolina at Chapel Hill have served to stimulate innovation and R&D throughout central North Carolina. In order to provide focused attention to fostering the growth of the region, the Research Triangle Regional Partnership (RTRP) was established as a public-private sector partnership "dedicated to keeping the 13-county Research Triangle Region economically competitive through business, government and educational collaboration."

In 2005, the Research Triangle of North Carolina was ranked "the number one region for technology businesses in the United States." The study by the Silicon Valley Leadership Group scored regions based on organizational productivity and employee quality of life. The Triangle ranked above Silicon Valley and six other prominent technology areas in the U.S.¹¹⁹ In 2005, Ernst & Young also ranked North Carolina as the nation's No. 3 state for biotechnology based on number of companies.¹²⁰

According to the Partnership, the Region's economic development strategy "seeks to leverage that strength by promoting growth in these life science and technology clusters in which the region is a world leader or has the potential to lead." These clusters include:

- Advanced Gaming and E-Learning
- Advanced Medical Care
- Agricultural Biotechnology
- Analytical Instrumentation
- Biological Agents/Infectious Diseases
- Clean/Green Technologies
- Defense Technologies
- Informatics
- Nanoscale Technologies
- Pervasive Computing
- Pharmaceuticals

In 2001, the Region's leaders commissioned Harvard's Michael Porter to develop a "new vision to guide [the Region's] economic development." Based on Porter's work, a five-year \$5 million initiative was launched to create 100,000 new jobs in the Region's 13 counties. In 2008, the Research Triangle Economic Development Legislative Action Agenda was developed and endorsed by over 20 of the Region's chambers of commerce and economic development agencies. The Agenda includes a comprehensive plan for making strategic investments in infrastructure, education and workforce development and creating targeted incentives to attract new businesses and investments.¹²¹

¹¹⁹ <http://www.encyclopedia.com/doc/1P1-113776082.html>

¹²⁰ http://www.rtrp.org/NewsReleases_detail.php?recordID=1011

¹²¹ http://www.researchtriangle.org/uploads/media/2008_Regional_Agenda.pdf

Key Success Factor #5 : Coordinated efforts via a public-private partnerships to develop and support the region's tech economy by nurturing and promoting existing and emerging business technology clusters.

Key Elements of the Research Triangle's Innovation Ecosystem

Research, Ideas, Innovations, Tech Transfer

- The Research Triangle Region is deeply engaged with three top research universities: Duke University, North Carolina State University and the University of North Carolina at Chapel Hill.
- According to the RTRP, more than \$2 billion per year are invested in R&D conducted at universities, federal labs and contract research companies in the Region.¹²²

Entrepreneurs

- Through Research Triangle Park initiatives, university technology transfer programs, and business incubators, entrepreneurs are encouraged and supported in their efforts to start and grow new companies.

Investment Capital

Venture Capital

- While venture capital investors are active in The Triangle, VC investments into the Region are substantially lower than in the Silicon Valley. In 2009, North Carolina received \$289 million in venture capital investments, down from \$436 million in 2008 (a figure that has remained relatively steady since 2001). In comparison, Silicon Valley firms received \$1.9 billion in Q4 2009 alone.¹²³

Angel Investors

- There are several active angel investor organizations in The Triangle. For example, The Triangle Accredited Capital Forum works “as a center for the connection of credible investors with promising companies.” Typical investments for early stage companies range between \$250,000 to \$2 million.¹²⁴

Seed Funds

- For over 20 years, the North Carolina Biotechnology Center has supported early stage biotech companies in the state with loans of up to \$250,000. Loans must be matched with private angel or VC investments.¹²⁵

¹²² http://www.rtrp.org/pages.php?page_id=2

¹²³ <https://www.pwcmoneytree.com>

¹²⁴ <http://www.fundingpost.com/angelgroup/Angel-group-profile.asp?fund=121>

¹²⁵ http://www.rtrp.org/NewsReleases_detail.php?recordID=1011

Workforce

- The Research Triangle Region has a highly educated and relatively high-income population.
- Roughly 47% of the adult population holds a college degree. The top four counties in the state with the highest percentages of adults with an advanced degree are all within The Triangle. Orange County (130,000 residents), located on the edge of the Research Triangle Park, includes the city of Hillsborough (the county seat) and Chapel Hill (home of the University of North Carolina). Durham County, home of the RTP, ranks second at 18.9%, Watauga County is third with 16.4%, and Wake County is fourth with 16.1%.
- Per capita income for the Raleigh-Cary Metro Area was \$31,600 in 2008. In comparison, 2008 per capita income in the Silicon Valley was \$40,350.
- The Research Triangle Economic Development Legislative Action Agenda includes specific initiatives for workforce development targeted at addressing the region's needs for technology workers.

Social and Professional Networks

- The Research Triangle Regional Partnership facilitates interaction between private firms in the region and a wealth of information, support and networking opportunities via 80+ institutional partners, 34 chambers of commerce, 100 global trade and commerce partners and four cluster networks.¹²⁶
- Other professional networks include the RTP chapter of Women in Technology International (WITI)¹²⁷ and the Triangle Technology Executives Council (TTEC) comprised of the executive technology leadership in the region.¹²⁸

Business Environment

- According to a 2009 study by BizJournals, the top two markets in the U.S. for small-business vitality, are in North Carolina. Raleigh ranked No. 1 in the nation, while Charlotte ranked No. 2. BizJournals used a six-part formula to analyze the nation's 100 largest metropolitan areas, searching for “the places that are most conducive to the creation and development of small businesses.”¹²⁹

Other accolades for the state and the Triangle Region include:¹³⁰

- # 1 America's Most Wired City (Raleigh) - Forbes, March 2, 2010

¹²⁶ http://www.researchtriangle.org/uploads/pdfs/RTRP_Partners.pdf

¹²⁷ <http://www.witi.com/rtp/>

¹²⁸ <http://www.ncttec.net/>

¹²⁹ <http://www.portfolio.com/news-markets/national-news/portfolio/2009/02/04/Best-Areas-to-Start-a-Small-Business/>

¹³⁰ http://www.researchtriangle.org/accolades.php?page1=5&page2=129&page_id=129

- # 1 Best Value for Public Colleges (UNC-Chapel Hill) for 2009-10 - Kiplinger's Personal Finance, February 2010
- # 15 Best City for Business (Raleigh) - MarketWatch, December 16, 2009
- # 1 Best State Business Climate (NC) - Site Selection, November 2009
- # 1 America's Smartest City (Raleigh-Durham) - The Daily Beast, October 4, 2009
- Top U.S. States (NC) for Cleantech in 2009 (Honorable Mention) - Cleantech Group LLC, Sustainable World Capital, August 17, 2009
- "Top 10 Startup-friendly Cities" (Chapel Hill) - Entrepreneur, August 2009
- # 2 Area for Computer and Peripheral Equipment Manufacturing (Durham MSA) North America's High-Tech Economy: The Geography of Knowledge-Based Industries, Milken Institute, June 2, 2009
- # 1 Place (Greater Raleigh-Durham) for Innovation Pipeline: Life Sciences R&D The Greater Philadelphia Life Sciences Cluster 2009: An Economic and Comparative Assessment, Milken Institute, May 19, 2009
- # 1 Place (Greater Raleigh-Durham) for Growth in R&D in the Life Sciences The Greater Philadelphia Life Sciences Cluster 2009: An Economic and Comparative Assessment, Milken Institute, May 19, 2009

Quality of Life

- North Carolina offers a relatively high quality of life with many opportunities for outdoor sports and activities. The Research Triangle Region has frequently been ranked among the highest regions in the country for quality of life.¹³¹
- In a 2006 survey of various economic indicators, the Raleigh-Durham area of the Research Triangle Region had the lowest overall cost of living when compared to the Boston, New York and San Francisco regions.¹³²
- Cultural venues include the Progress Energy Center for the Performing Arts, the Time Warner Cable Music Pavilion in Raleigh and the Durham Performing Arts Center in Durham.¹³³
- The Raleigh-Durham-Chapel Hill region's climate is generally mild and temperate with an average of 220 days of sunshine a year, and monthly average rainfall of 3.6 inches.¹³⁴

¹³¹ <http://www.intersil.com/about/RTPLiving.asp>

¹³² Ibid.

¹³³ http://en.wikipedia.org/wiki/Research_Triangle

¹³⁴ <http://www.intersil.com/about/RTPLiving.asp>

Southern California’s San Diego Region

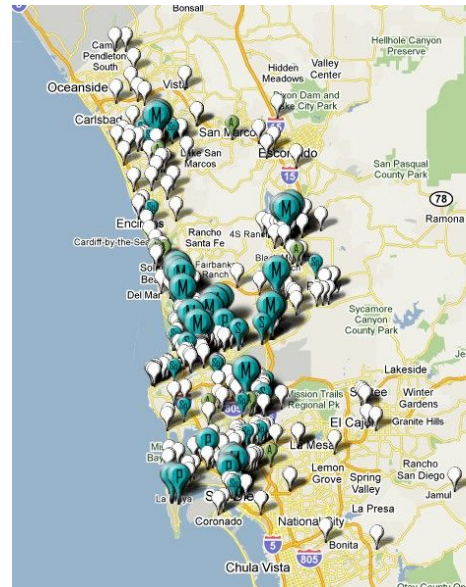
Overview of San Diego’s Economy

San Diego in southern California is the second largest city in California, one of the top ten largest cities in the country, and another example of an economic success story – particularly for a city once referred to as a “sleepy defense town.” Given San Diego’s enviable location on the southern California coast, tourism emerged in the early 1900s as a major sector of the region’s economy. The tourism industry contributed to the evolution of supporting sectors including transportation, logistics and sporting goods. During the same period, San Diego became the home of several major military bases and since the early 1900s; the defense industry has been a cornerstone of the city’s economy. The influence of the defense industry led to the evolution of industry clusters around communications, aerospace vehicles and analytical instruments.¹³⁵

Key Success Factors: A naturally beautiful environment and idyllic weather that supports a thriving tourism industry. A world-class warm water harbor on the Pacific Rim that serves as a base for U.S. military facilities and as a gateway for U.S. commercial shipping is an important asset of the San Diego economy.

With a popular campus of the University of California system in nearby La Jolla, it’s hard to imagine that the region wouldn’t develop a tech economy. The third contributor to the emergence of a variety of tech clusters has been (and still is) the University of California at San Diego. During the 90s, technology transfer licenses from the University to the private sector increased five-fold.¹³⁶ As a result, the University’s aggressive tech transfer program, along with the establishment of several bioscience and research centers in the region, sparked the formation of the region’s biotech cluster - over 100 biotech companies have spun out of UC San Diego.¹³⁷ In the mid-80s, eight visionary leaders¹³⁸ launched CONNECT at UC San Diego with the goal to “*accelerate the nascent innovation economy in San Diego.*” CONNECT and its first Executive

Figure 1 – San Diego’s “Silicon Beach”^{**}



* Map of CommNexus member organizations and communication technology firms in the greater San Diego region

Source: CommNexus

¹³⁵ http://www.isc.hbs.edu/pdf/20080122_EuropeanClusterPolicy.pdf

¹³⁶ http://www.connect.org/programs/connect-track/docs/Q409_CONNECT%20InnovationReport.pdf

¹³⁷ http://www.connect.org/programs/connect-track/docs/Q409_CONNECT%20InnovationReport.pdf

¹³⁸ CONNECT founders: Irwin Jacobs - Chairman, QUALCOMM; Richard Atkinson - President Emeritus, University of California (and former Chancellor, UCSD); Lea Rudee - Founding Dean UCSD School of Engineering; Mary Walshok - Associate Vice Chancellor, Public Programs and Dean, UCSD Extension; Buzz Woolley - President, Girard Capital/Girard Foundation; David Hale - Chairman, Hale BioPharma Ventures LLC (Chair, CONNECT Board); Dan Pegg - Former President & CEO, San Diego Regional Economic Development Corporation

Director Bill Otterson is credited with establishing San Diego’s “culture of collaboration” that has contributed to the region’s sustained economic development success.¹³⁹

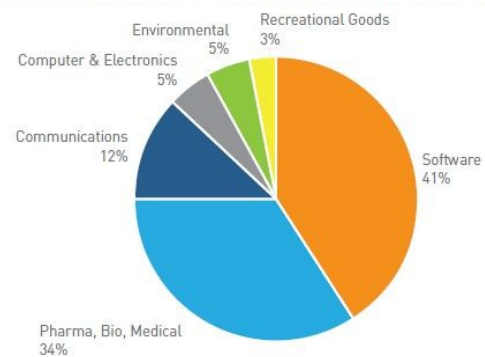
Key Success Factor: The region is home to a world-class education and research institution with numerous institutes and research centers. The campus serves as a hub of innovation and a primary source of technology start-ups.

In the early 90s, the region experienced rapid growth in other tech sectors including digital wireless communication, high definition digital technology, medical imaging, and materials science technology.¹⁴⁰ With the tech boom of the late 90s, employment in tech sector’s increased substantially. Between 1995 and 2002, the number of tech jobs increased by 25% directly attributed to a surge in the number of tech companies (up 67%) during the same period.¹⁴¹

By 2001, San Diego’s competitive position was ninth in the nation against 18 other U.S. regions.¹⁴² A survey of the region’s economy identified several key tech industry clusters¹⁴³ including:

- Biomedical products
- Biotechnology and pharmaceuticals
- Communication
- Computer and electronics manufacturing
- Defense and transportation manufacturing
- Environmental technology
- Software and computer technology

Figure 2 – San Diego Start-ups by Industry, Q4 2009



Source: CONNECT

Home to the pioneering wireless company Qualcomm, San Diego now has the world’s largest wireless business cluster.¹⁴⁴ Seeing the opportunities for synergy between wireless communication and healthcare, visionary industry leaders from both sectors formed the Wireless-Life Sciences Alliance “to create and promote an ongoing and expanding dialogue around the many opportunities to use wireless technologies to advance the delivery of healthcare.”¹⁴⁵ The region also has a growing analytics industry cluster.¹⁴⁶ Several other clusters are also emerging including information security and unmanned vehicle systems.¹⁴⁷

¹³⁹ <http://www.connect.org/about/>

¹⁴⁰ <http://www.sandiego.gov/science-tech/about/about.shtml>

¹⁴¹ <http://www.sandiego.gov/science-tech/pdf/stepforum.pdf>

¹⁴² <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

¹⁴³ <http://www.sandiego.gov/science-tech/pdf/stepforum.pdf>

¹⁴⁴ <http://www.connect.org/cluster-development/wireless-life-sciences-alliance/>

¹⁴⁵ <http://www.connect.org/programs/wireless-life-sciences-alliance/>

¹⁴⁶ <http://www.xonomy.com/san-diego/2009/11/13/san-diego-serves-as-a-hotbed-for-analytics-tech-cluster-at-least-up-to-a-point/>

¹⁴⁷ <http://www.connect.org/cluster-development/>

Even with its natural advantages and thriving economy, San Diego's business and community leaders have taken the initiative to build, grow and adapt the city's economy to maintain its competitive position.¹⁴⁸ To facilitate and support the rapid growth of the region's tech economy, the city formed the San Diego Science and Technology Commission *“to advise the Mayor and Council on policy and issues shaping this dynamic and exciting frontier, and advice on continued investment in [the] region.”* Members include representatives from San Diego's biotech, wireless, high-tech and scientific community, and the academic and research community.¹⁴⁹

In 2004, the Commission convened the Science and Technology Economic Prosperity (STEP) Forum in partnership with the City's Community and Economic Development Department and the San Diego Regional Economic Development Corporation to *“share information about the impact of technology industries on the San Diego economy and regional economy, to discuss opportunities, issues and impediments that impact the growth of these industries, and to identify industry priorities to determine what policy actions might ensure that technology industries thrive in the city and region.”*¹⁵⁰

The region's tech economy continues to flourish despite the economic recession. The region's economy includes over 300 defense and security companies, more than 1,000 wireless and software companies, 600+ life sciences firms, and 250+ energy and environmental companies. In 2009, over 300 new technology start-ups were formed in San Diego creating over 1,000 new jobs. Companies and research organizations in San Diego received almost \$1.2 billion in grants from the National Institutes of Health and National Science Foundation in 2009, up 35% from the previous year. In Q4 2009, San Diego as a region ranked fourth behind Silicon Valley, New England, and New York Metro regions for venture capital investments. Southern California (San Diego and LA/Orange Counties) ranked third nationally.¹⁵¹

Key Success Factor: The region's leaders have recognized and capitalized on core technology clusters and emerging clusters that have evolved naturally and through intentional and focused initiatives and efforts.

¹⁴⁸ http://www.nrel.gov/technologytransfer/pdfs/igf20_denniston.pdf

¹⁴⁹ <http://www.sandiego.gov/science-tech/about/about.shtml>

¹⁵⁰ <http://www.sandiego.gov/science-tech/pdf/stepforum.pdf>

¹⁵¹ http://www.connect.org/programs/connect-track/docs/Q409_CONNECT%20InnovationReport.pdf

The Emerging Cleantech Cluster

Cleantech has become a major focus of the city’s economic development strategy going forward. The city launched a Cleantech Initiative in 2007 to “*promote the expansion, attraction and retention of businesses that develop products and technologies that provide environmentally sustainable solutions.*”¹⁵² and to develop a cleantech cluster in the region. Partners in this Initiative include the City's Economic Development Division, the San Diego Regional Economic Development Corporation (EDC), and the University of California.¹⁵³ A recent survey determined that there are roughly 148 cleantech companies in the San Diego region in the fields of energy generation (67%), water and wastewater, energy efficiency, and recycling and waste. (See Figure 3)

Parallel to this, a number of organizations have been formed to support the development of the region’s cleantech sector. These include the Center for Commercialization of Advanced Technologies (CCAT), the Center for Energy Sustainability, and Cleantech San Diego. Another initiative was recently launched to accelerate development of algae-to-biofuels technology. Initiated by a consortium of academic and industry researchers, the San Diego Center for Algae-based Biofuels is an effort “*to make sustainable algae-based biofuel production a reality in the next 5 to 10 years.*”¹⁵⁴ The impetus for the Center came from Cleantech San Diego, a non-profit organization formed in 2007 by the city of San Diego and local economic development groups.¹⁵⁵ (See Figure 2)

Figure 3 – Cleantech Companies in the San Diego Region



Source: *Cleantech Industry in San Diego*, June 2007

Key Success Factor: The region has embraced “the cleantech revolution” and recognized the opportunity to leverage the region’s assets to stimulate a new cleantech sector.

¹⁵² <http://www.sandiego.gov/economic-development/business-assistance/cleantech/index.shtml>

¹⁵³ <http://www.sandiego.gov/economic-development/business-assistance/cleantech/index.shtml#cluster>

¹⁵⁴ <http://www.xconomy.com/san-diego/2008/12/30/a-mini-cluster-of-algae-to-biofuels-technology-blooms-in-san-diego/>

¹⁵⁵ <http://www.xconomy.com/san-diego/2009/01/21/san-diego-algae-biofuels-industry-gains-steam-with-rd-consortium/>

Key Elements of the San Diego Innovation Ecosystem

Research, Ideas, Innovations, Tech Transfer

- The University of California at San Diego is a world class teaching and research institution. The University supports numerous excellent schools, centers and institutes including the Scripps Institution of Oceanography, considered to be one of the world's leading research centers for basic and applied research in all areas of earth and ocean sciences and the Jacobs School of Engineering. The School has ten affiliated institutes including the Center for Wireless Communications; the Center for Energy Research; the California Institute for Telecommunications and Information Technology, a multi-campus initiative and a multi-discipline research center; and the San Diego Supercomputer Center, of the largest and best known advanced computing centers in the world.¹⁵⁶
- The 50 research institutions associated with UCSD receive over \$2 billion in research funding and generate over 7,000 patent applications and awards per year.
- UC San Diego is 6th in research funding in the U.S. and ranks 13th in the world as an academic institution.¹⁵⁷
- San Diego State University is the third largest state university in California. SDSU supports a variety of research organizations including the Salk Institute for Biological Studies and the San Diego Center for Molecular Agriculture. In 2005, San Diego State was named the top small research university in the nation.¹⁵⁸

Entrepreneurs

- In Q4 2009, San Diego accounted for 11% of new technology businesses in California placing it third after Los Angeles and Santa Clara counties.
- Local entrepreneurs are encouraged and supported through a variety of organizations and programs CONNECT events, the San Diego Entrepreneurs Exchange, the San Diego Business Club, and the UC San Diego Entrepreneur Challenge. The Challenge “creates a platform previously absent from UC San Diego where scientists, engineers, and business students may interact.” The organizations young entrepreneurs with intellectual property law firms, angel investors, venture capitalists, and successful local business professionals.¹⁵⁹
- EvoNexus is a non-profit incubator for early stage high tech companies in the San Diego area sponsored by CommNexus, a high tech industry group.¹⁶⁰
- The Founder Institute is a four-month training program for both new and seasoned entrepreneurs that “*prepare founders to lead the next generation of world-class technology companies across a wide range of industries, from the biotech to the internet.*”¹⁶¹

¹⁵⁶ <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

¹⁵⁷ GlobalCONNECT

¹⁵⁸ Faculty Scholarly Productivity Index, 2005

¹⁵⁹ <http://challenge.ucsd.edu//content/view/13/80/>

¹⁶⁰ <http://www.commnexus.org/incubator/about-us/>

¹⁶¹ <http://www.founderinstitute.com/>

- The Pfizer Incubator in San Diego/La Jolla provides scientist-entrepreneurs with an extensive support system for taking innovative ideas from the lab to the market. The incubator is sponsored by Pfizer, one of the world's largest pharmaceutical companies.¹⁶²

Investment Capital

Venture Capital

- The San Diego Economic Development Corporation identified 24 venture capital firms with offices in the San Diego region.¹⁶³ The city's 2007 cleantech industry assessment identified more than 90 risk capital firms with offices in the San Diego County.¹⁶⁴
- In 2009, venture capital investments in San Diego companies totaled \$900 million, down 25% from \$1.2 billion (132 deals) in 2008.
- The life sciences sector received the largest share of VC financing (67%, \$202 million) in Q4 2009 followed by the industrial/energy sector (\$34 million).¹⁶⁵
- The San Diego Venture Group, a non-profit organization, "*fosters ideas on how to form, fund and build new ventures.*"¹⁶⁶

Angel Investors

- The Tech Coast Angels is a network of private investors managed by CONNECT. Members invest from \$50,000 to \$500,000 in early stage companies located in the Southern California region while also providing valuable business expertise and access to resources.¹⁶⁷
- Emporium Angels focuses on new technological industries such as telephony, biotechnology, radio frequency identification (RFID), information technology, software applications, medical equipment, and semiconductors.¹⁶⁸
- The Keiretsu Forum, the nation's largest angel investor organization, has an active chapter in San Diego.¹⁶⁹

Seed Funds

- The von Liebig Center at UC San Diego awards seed funds of up to \$75,000 to "*support commercialization of UCSD discoveries with near-term market prospects.*" Funds may be awarded to UCSD faculty members and researchers, or to UCSD graduate students who partner with a faculty mentor.¹⁷⁰ The Center also provides entrepreneurs with a variety of support services including access to faculty expertise.

¹⁶² <http://www.thepfizerincubator.com/index.html>

¹⁶³ <http://www-rohan.sdsu.edu/dept/emc/documents/San-Diego-Venture-Capital-Firms.pdf>

¹⁶⁴ <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

¹⁶⁵ http://www.connect.org/programs/connect-track/docs/Q409_CONNECT%20InnovationReport.pdf

¹⁶⁶ <http://www.sdv.org/>

¹⁶⁷ <http://www.connect.org/funding/tech-coast-angels/>

¹⁶⁸ <http://www.fundingpost.com/angelgroup/angel-group-profile.asp?fund=46>

¹⁶⁹ <http://www.keiretsuforum.com>

¹⁷⁰ http://www.vonliebig.ucsd.edu/services/services_seed/index.shtml

Workforce

- The 2007 Cleantech Industry Assessment noted that San Diego has a “highly skilled workforce.” The report states that “San Diego has a strong talent pool of science and engineering capabilities due to its existing technology industries such as biotechnology, wireless telecommunications, and defense.”¹⁷¹
- Roughly one-third of all UC San Diego graduates have remained in the San Diego area.
- The San Diego Workforce Partnership, Inc. was founded in 1974 through a joint powers agreement between the City and the County of San Diego to assure the region’s workforce is properly aligned with the needs of the region’s business and industry needs.¹⁷²

Social and Professional Networks

- Visionary organizations such as the city’s Science and Technology Commission, CommNexus and CONNECT provide mechanisms, events and support programs to “*facilitate technology transfer, educate innovators and connect them with the resources necessary to create successful companies.*” CommNexus (formerly the San Diego Telecom Council) is a non-profit network for the communications industry. CommNexus sponsors over 50 networking and technical events per year and provides an award-winning website and on-line resource portal for start-up communications companies.¹⁷³ CONNECT annually hosts over 300 educational and networking events.¹⁷⁴
- Industry-specific organizations such as the Wireless-Life Sciences Alliance and the San Diego Center for Algae-based Biofuels foster new connections and support nascent technology sectors.
- The Downtown San Diego Partnership is a non-profit organization dedicated to “strengthening the business, residential and cultural environment of downtown San Diego.” The Partnership hosts special events and networking opportunities throughout the year.¹⁷⁵

Business Environment

- According to the Kosmont-Rose Institute Cost of Doing Business Survey, San Diego “compares well to other major metropolitan areas.”¹⁷⁶
- The region has developed a strong base of professional services firms that support the innovation economy. For example, a 2007 survey identified more than 750 intellectual property attorneys within San Diego County.¹⁷⁷

¹⁷¹ <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

¹⁷² http://www.sandiegoatwork.com/generate/html/About_Us/about_us_subhome.html

¹⁷³ <http://www.commnexus.org/about/>

¹⁷⁴ <http://www.connect.org/funding/>

¹⁷⁵ <http://downtownsandiego.org/index.cfm/fuseaction/about.home>

¹⁷⁶ <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

- In 2009, Bizjournals ranked San Diego 47th in the nation for small business vitality.¹⁷⁸

Quality of Life

- San Diego has been an international tourist destination for decades. Holiday Magazine commented that San Diego is the “*only area in the U.S. with perfect weather.*”¹⁷⁹ The city hosts numerous music and performance festivals including the Adams Avenue Music and Arts Festival and the Mainly Mozart Festival.¹⁸⁰
- In 2006, *Money* magazine ranked San Diego as the fifth best place to live in the nation.¹⁸¹
- San Diego was ranked as the fifth wealthiest city in the nation by *Forbes* magazine.¹⁸²
- According to the City’s Economic Development Department, the city has 34,260 acres of developed and undeveloped open space, including three regional parks, 190 community and neighborhood parks, seven open-space parks, 26 shoreline parks, and 25 miles of ocean and bay beaches.¹⁸³ Balboa Park is one of the nation’s oldest and best urban parks. San Diego is also home to the famous San Diego Zoo and the San Diego Air & Space Museum.

¹⁷⁷ <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

¹⁷⁸ Bizjournals, February 2, 2009

¹⁷⁹ <http://www.sandiego.gov/economic-development/glance/quality.shtml>

¹⁸⁰ <http://www.sandiego.gov/economic-development/glance/quality.shtml>

¹⁸¹ <http://www.sandiego.gov/cpci/press/cleantechjune07.pdf>

¹⁸² Ibid.

¹⁸³ <http://www.sandiego.gov/economic-development/glance/quality.shtml>

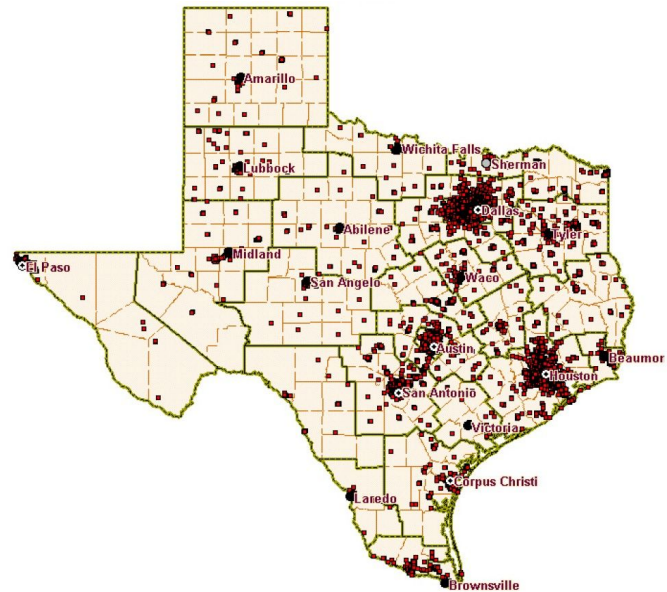
Texas and the Austin Region

Overview of the Texas IT Cluster

Texas is one of the country's top tech states. In 2005, Texas ranked 2nd in the number of high-tech workers, in the size of high-tech payroll, in the number of tech businesses and in the value of high-tech exports.¹⁸⁴ The core of the state's tech economy is its well-established IT industry base that is often referred to as the Texas IT Cluster.

Numerous national and international companies have established operations in Texas, primarily around the state's largest urban centers: the Dallas-Ft. Worth area, the Houston area, and in the greater Austin and San Antonio areas.¹⁸⁵ These include Nortel, Alcatel, Ericsson, EDS and Cisco Systems. The Telecom Corridor® Genealogy Project tracks the lineage of over 5,000 companies back to Collins Radio¹⁸⁶ and Texas Instruments – two pioneering electronics-telecommunications companies that set up shop in the Dallas area during the 1950s.

Figure 1 – Texas IT Cluster - IT Businesses with 5+ Employees



Key Success Factor: Pioneering companies in growth industries that spawned numerous spin-offs.

In 2005, the state commissioned a comprehensive assessment of the IT Cluster. This study identified eight industry cluster categories:

- Logistics/supply chain solutions
- Cybersecurity
- Homeland security
- Digital media arts
- Border security
- RFID/smart cards
- Supercomputing

¹⁸⁴ AeA, Cyberstates 2005 Report, April 2005

¹⁸⁵ *State of Texas Information and Computer Technology Cluster Assessment*, August 2005

¹⁸⁶ The Collins Radio Company was purchased by Rockwell International in 1973. In 2001 the avionics division of Rockwell International was spun-off to form the current Rockwell Collins, Inc., retaining its name. - Wikipedia

- Wireless

The report recommended that Texas form “cluster working groups” to develop strategic plans for guiding further initiatives. One region that stands out in terms of IT and telecommunication innovations is greater Austin. According to the Assessment, the Austin region is a key innovation center for the state generating the largest share of IT and telecom patents (47.5%) in the state between 1990 and 2003.¹⁸⁷

Key Success Factor: Deliberate and successful efforts by the public sector to support regional economic development by identifying, targeting and supporting emerging industry clusters.

Overview of Austin’s Technology Cluster

As the capital of Texas, the state government forms one of the region’s primary economic drivers - almost all of the state’s agencies are headquartered in Austin. The second driver is the University of Texas at Austin, a major center for academic research. In 2009, University’s research expenditures topped \$590 million.¹⁸⁸ The third primary driver is the region’s electronics, IT and computer industry cluster. The evolution of “the Silicon Hills” as the Austin region is known, dates back to the 1960s when the city’s business community initiated efforts to encourage electronics companies to locate their manufacturing facilities in Austin. Since then numerous major electronics, IT and computer companies have opened facilities in Austin including Texas Instruments, IBM, AMD, Freescale Semiconductor, Samsung, and 3M. In 1984, Michael Dell founded what would become Dell Computer while a student at the University of Texas at Austin. Now a major global corporation, Dell’s global headquarters are located in Austin. Today, Austin is home to more than 2,200 technology companies.¹⁸⁹

Key Success Factors: A strong local economy with a well-funded research university as a centerpiece that inspires industry leaders to start and/or locate their tech businesses in the region. A visionary business community that takes the initiative to leverage emerging industry trends.

Austin’s watershed event took place in 1983 when the city beat 57 other cities in a site selection competition as the location for Microelectronics and Computer Technology Corporation (MCC), a private high-tech consortium. Austin’s bid for the MCC deal was directly due to a successful collaboration between the Governor’s office, the University of Texas at Austin and the Greater Austin Chamber of Commerce. The aggressive effort included a major package of incentives valued at over \$20 million including a commitment to constructing a new facility and lab at the University of North Texas, creation of 32 endowed chairs of engineering and natural science, and numerous benefits for MCC employees (e.g. fellowships, teaching positions, etc.).¹⁹⁰ The ripples from the MCC deal are still being felt in throughout the state and regional economies.

¹⁸⁷ *State of Texas Information and Computer Technology Cluster Assessment*, August 2005

¹⁸⁸ “President Powers Delivers 2009 State of the University Address,” University of Texas

¹⁸⁹ <http://www.kansascityfed.org/PUBLICAT/NewGovernance04/Powers04.pdf>

¹⁹⁰ <http://www.kansascityfed.org/PUBLICAT/NewGovernance04/Powers04.pdf>

In 1988, Austin won another site location bid for the headquarters of SEMATECH, a consortium of most of the country's semiconductor manufacturers. The same team that put together the MCC bid that included the creation of a new research park and financing for a manufacturing facility. These two successful bids (and later a third) are shining examples of multi-organizational collaboration – cooperation so unselfish that the City of San Antonio withdrew its bid in favor of Austin's and Texas A&M threw its support behind the University of Texas at Austin's commitments to the MCC incentive package.¹⁹¹

Key Success Factor: Enlightened public and private sector collaboration that transcends regional self-interests toward a greater vision of longer-term benefits for all.

In 1985, the Greater Austin Chamber of Commerce commissioned SRI International to develop a strategic plan for the region's economic development. SRI's plan called for continuing public-private collaboration, the development of business incubators, improving access to capital, and instituting workforce development programs in line with industry cluster needs.

1998, the Chamber retained the ICF Kaiser Group to carry out a similar assessment focusing on the region's IT and software industry clusters. A third study in 2003 was commissioned to identify strategies for spurring the region's tech sector recovery following the dot-com bust. In response to the 2003 study, the region's business community raised \$11 million for an economic development program called *Opportunity Austin*. The study outlined four key components: retain existing businesses and support their expansion; recruit new businesses in complementary industries; stimulate entrepreneurship and emerging tech sectors; and aggressively market the Austin region while improving its regional competitiveness.

Key Success Factors: Top flight planning using outside expertise along with a willingness to listen to honest assessments of the region's strengths and weaknesses then act. The ability to implement a well-crafted strategic plan along with the political will to commit sufficient funds and resources to implement the plan's goals and objectives over a sustained period of time.

Since the mid-80s, Austin's business and political leaders have not slackened the pace of their efforts to build and maintain the region's innovation economy.

- Founded in 1989 as a non-profit division of the University of Texas at Austin and a key program of the University's IC² Institute, the Austin Technology Incubator supports start-up and early stage companies in four target fields: bioscience, clean energy, IT and wireless technology. ATI's work with bioscience firms is managed as the ATI Bioscience Incubator in cooperation with BioAustin, Austin Life Science entrepreneurs, and local medical centers. ATI also manages its work in clean tech as a "branded" operation called the ATI Clean Energy Incubator supported in part by the Texas State Energy

¹⁹¹ Ibid.

Conservation Office, the U.S. Dept. of Energy, the City of Austin and Austin Energy. Over 150 teams of entrepreneurs have raised over \$725 million in investment capital.¹⁹²

- Austin also has a thriving biotech sector. The Texas Healthcare & Bioscience Institute, headquartered in Austin, brings together local biotech firms, pharmaceutical companies, various universities and research institutions to “*promote healthcare and bioscience research, development and manufacturing in Texas.*”¹⁹³
- Several angel investor networks have been formed to provide seed and early stage funding for startups and early stage companies. The Central Texas Angel Network headquartered in Austin is a non-profit organization supported by various institutions in the trade industry, local schools of business, and other organizations. CTAN’s average investment is \$250,000 per deal.¹⁹⁴ The Capital Network¹⁹⁵ was also formed to provide seed and early stage funding for emerging tech companies.
- The Austin Technology Council was formed in 1994 “*to ensure that Austin maintains its world-renowned technology status, and a community that capitalizes on its assets - university-based research, venture funding, a broad array of support services, an entrepreneurial culture and a rich pool of intellectual talent and leadership.*”¹⁹⁶
- Leaders in the region’s wireless cluster including Freescale, SEMATECH, SBC Laboratories formed the non-profit Austin Wireless Alliance to “*promote Austin as a global leader in business activity, technical innovation, and community participation within the wireless industry.*”
- Numerous other tech-oriented organizations have been formed to support the region’s tech economy including BioAustin, a biotech industry organization; Austin Women in Technology; the Digital Media Council; the Green Technology Alliance; Technology Entrepreneurs' eXchange; and the International Game Developers Austin. All of these organizations are partners in the Austin Technology Council.

Key Success Factors: A rich and diverse ecosystem of support systems for entrepreneurs and start-up companies. Numerous interlinked business and professional networks sharing a commitment to the region’s economic prosperity.

Key Elements of the Austin Innovation Ecosystem

Research, Ideas, Innovations, Tech Transfer

- With annual research funding of over \$400 million, the University Of Texas At Austin is one of the nation’s top public research universities. The University sponsors more than 3,500 research projects at 90 research units. According to the University, “*more than 400*

¹⁹² <http://www.ati.utexas.edu/cei2.htm>

¹⁹³ <http://www.kansascityfed.org/PUBLICAT/NewGovernance04/Powers04.pdf>

¹⁹⁴ <http://austin.bizjournals.com/austin/stories/2009/08/03/story3.html>

¹⁹⁵ Later called the CN Group and now a part of Westlake Securities LLC

¹⁹⁶ <http://www.austintechcouncil.org/>

patents have been awarded to the University since its inception and licensing deals generate more than \$11 million annually.”¹⁹⁷

Entrepreneurs

- Austin, and Texas in general, has a culture of entrepreneurship that stems from pioneering tech firms and their numerous spin-offs that located in the region.
- The Austin Technology Incubator and other support systems assure the region’s entrepreneurs receive the guidance and access to money, resources and expertise needed to grow and succeed.

Investment Capital

Venture Capital

- Texas typically ranks sixth in the U.S. for venture capital investments. \$1.4 billion in 2007, \$1.3 billion in 2008, \$644 million in 2009.¹⁹⁸ VC investments in Austin companies totaled \$590 million in 2008 and \$219 million in 2009.¹⁹⁹
- Austin is home to numerous venture capital companies including Austin Ventures, a VC firm with over \$3 billion under management. Thirty-one percent of Austin Venture’s investments in 2009 were in Austin-area companies compared with 56% in 2008 and 62% in 2007.²⁰⁰
- In Q3 2009, Austin-based startups received over a third of all VC investments in Texas primarily in the Internet and mobile and telecommunications sectors.²⁰¹

Angel Investors

- Active angel investor groups including the Central Texas Angel Network provide funding as well as executive expertise for startups.

Seed Funds

- State-level funds such as the Texas Emerging Technology Fund²⁰² (a state-sponsored fund headquartered in Austin) and the Texas Enterprise Fund²⁰³ (also headquartered in Austin) also provide much-needed financing for start-ups and early stage companies. The ETF is the single largest pre-seed investor for emerging technology companies in the U.S.²⁰⁴

¹⁹⁷ <http://www.utexas.edu/opa/pubs/facts/research.php>

¹⁹⁸ PricewaterhouseCoopers MoneyTree Report

¹⁹⁹ Dow Jones VentureSource

²⁰⁰ <http://austin.bizjournals.com/austin/stories/2010/02/01/story3.html?b=1265000400^2804191>

²⁰¹ <http://www.chubbybrain.com/blog/2009/10/austin-leads-a-resurgent-texas-in-q3-2009-with-solid-venture-capital-activity-overtakes-ny-state-venturecapital/>

²⁰² *State of Texas Information and Computer Technology Cluster Assessment*, August 2005

²⁰³ http://en.wikipedia.org/wiki/Texas_Enterprise_Fund

²⁰⁴ http://en.wikipedia.org/wiki/Texas_Emerging_Technology_Fund,
http://members.texasone.us/site/PageServer?pagename=tetf_homepage

Workforce

- Approximately 120,000 of the 740,000 people (16%) employed in the Austin metro area work in technology industries.²⁰⁵
- Travis County (Austin) has the second-highest percentage (15.9%) of adults with advanced degrees in the state (second only to Brazos County, northwest of Houston).

Social and Professional Networks

- The Austin Technology Council and numerous tech-oriented business and professional organizations bring business and community leaders together to actively support entrepreneurial activities, educate business owners, promote the Austin region and sponsor innovative projects and programs to assure the region's long-term competitive advantages.

Business Environment

- Austin's public sector is an active catalyst for and facilitator of economic development.
- In 2004, Austin was ranked second among the world's knowledge regions, according to Robert Huggins Associates. Criteria included number of patents, IT manufacturing, spending for education, and strong economic activity.²⁰⁶
- In 2009, Austin was ranked 4th in the name for small business vitality by Bizjournals.²⁰⁷

Quality of Life

- *Money* magazine selected Austin as the No. 2 Best Big City in 2006 and No. 3 in 2009.²⁰⁸
- MSN selected Austin as the "Greenest City in America."²⁰⁹
- In 2009, *Forbes* magazine declared Austin to be "the least stressful large metro area" in the nation.²¹⁰
- Austin's official slogan is "The Live Music Capital of the World".²¹¹ The city boasts numerous music and performance venues and many popular festivals and events including the Austin Film Festival and the Austin City Limits Music Festival.

²⁰⁵ <http://www.fundingpost.com/venturefund/venture-fund-profile.asp?fund=245>

²⁰⁶ <http://www.fundingpost.com/venturefund/venture-fund-profile.asp?fund=245>

²⁰⁷ <http://www.bizjournals.com/specials/pages/230.html>

²⁰⁸ http://en.wikipedia.org/wiki/Austin,_Texas

²⁰⁹ http://en.wikipedia.org/wiki/Austin,_Texas

²¹⁰ http://en.wikipedia.org/wiki/Austin,_Texas

²¹¹ *Ibid.*

Benchmarking Summary

Common Traits of the Benchmark Regions

The four regions profiled above share several common traits. These include:

- The presence of at least two successful companies in similar fields that create a culture of expertise in one or more core fields (e.g. electronics manufacturing, health services) that served as the seed of one or more industry clusters.
- The presence of at least one progressive research-oriented university and/or several high-caliber research agencies or institutes that understand and support technology transfer to the private sector.
- Visionary public and private sector leaders who are willing to transcend politics and self-interests to foster the growth the region's innovation economy.
- Well-planned, well-financed and well-executed public-private sector initiatives (e.g. incubators, seed funds, business associations, networking events) to foster the growth of the region's existing and emerging high-tech industry clusters.
- Active business and professional organizations led by committed business and civic leaders who share a common vision of the region's long-term success.

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