
Building the Austin Technology Cluster: The Role of Government & Community Collaboration in *the Human Capital*

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Austin, Texas—*the Human Capital*—is one of a handful of American cities that has become a true center for technology innovation. For the past three decades, the city's leadership—in business, government, and academia—has collaborated on a vision of Austin's future that solidly embraces science and technology. Austin is not a secret any longer. With more than 30 years experience attracting (and keeping) technology companies, Austin is home to more than 2,200 technology companies, employing approximately 120,000 of the region's workforce. With technology as the future (for Austin, the United States, and the world), it is essential to stay competitive and collaborate. Redefining the role of government and community collaboration at all levels has made a huge difference for Austin. It can do so for other communities, too.

Why was Austin given the name *the Human Capital*? The capital city of Texas, with world-class higher education and a regional quality of life, attracts and retains the most important resource for 21st century business: an abundance of educated and skilled people. Austin, *the Human Capital*, positions people and the capital city cache as the region's greatest competitive advantage. *The Human Capital* is an epicenter for intellectual capital, power, policy, and politics; is geographically central with Texas and the Americas; and offers a stable and diverse public/private sector employment base. Austin's quality of life is highly ranked—noted for its environment, size, attitude, amenities, and unique style (See Charts 1 and 2).

THE AUSTIN, TEXAS STORY

What's Unique and Why?

Historically, Austin's economy has had two primary sectors: (1) The University of Texas at Austin; and (2) state government—Austin is the capital of Texas and home to virtually all state agencies. In the 1960s, the business community recruited an emerging and fledgling electronics industry, adding a third artery to the economy.

Over the past 30 years, Austin has attracted a diverse array of technology activities which include, among others:

- Corporate headquarters and manufacturing operations for Dell Corporation, which started in Austin and is now the largest seller of computers in the world, holding 16 percent of the PC market worldwide.
- Headquarters for Freescale Semiconductor, a publicly traded spin-off of Motorola's Semiconductor Products Sector (SPS), with 6,000 employees in Austin.
- IBM operations, employing 6,300 people in research and manufacturing.
- Advanced Micro Devices (AMD), employing 3,000 at its Austin site, which is more than at its headquarters in Sunnyvale, Calif., where 2,000

Chart 1

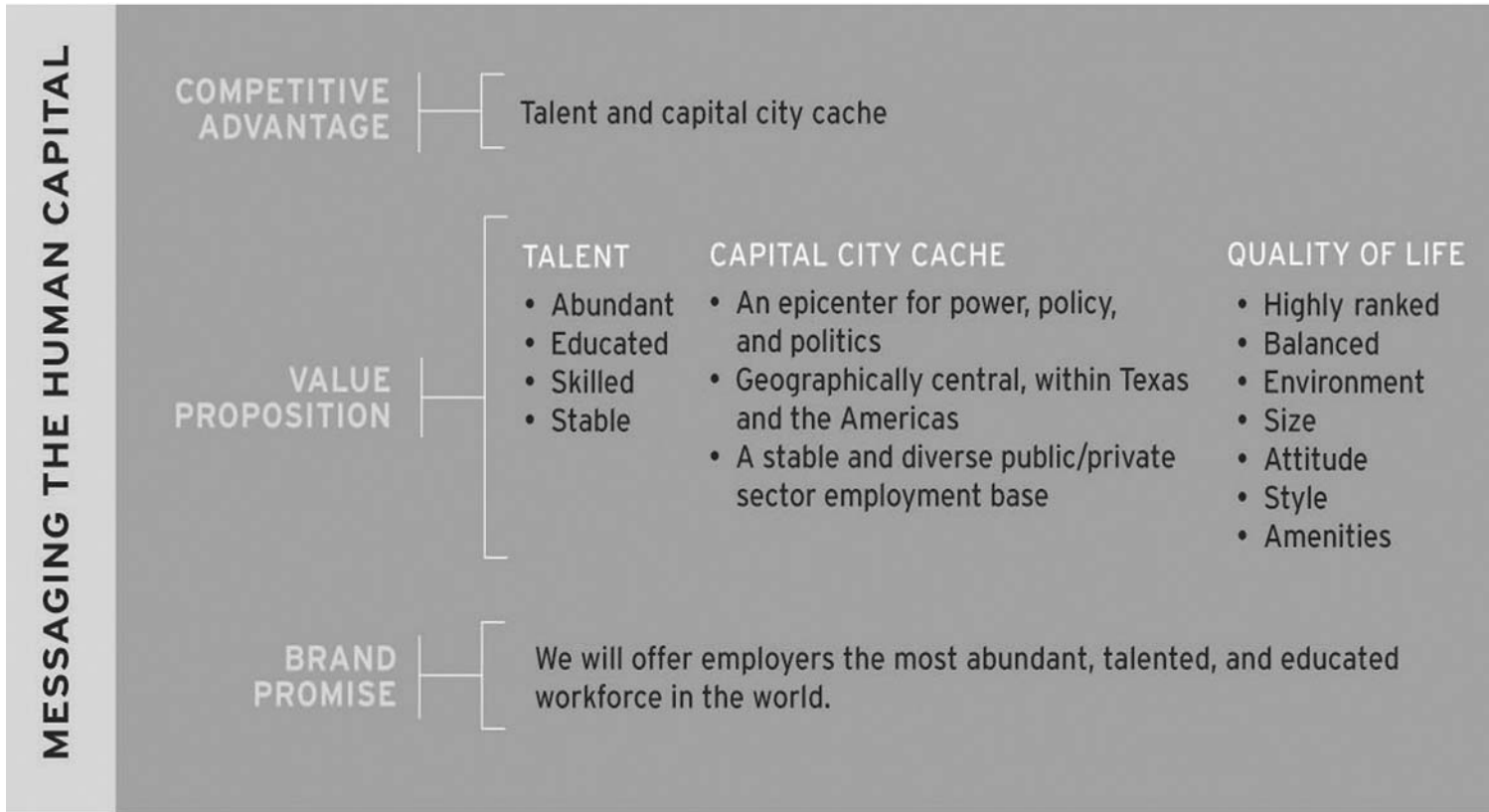
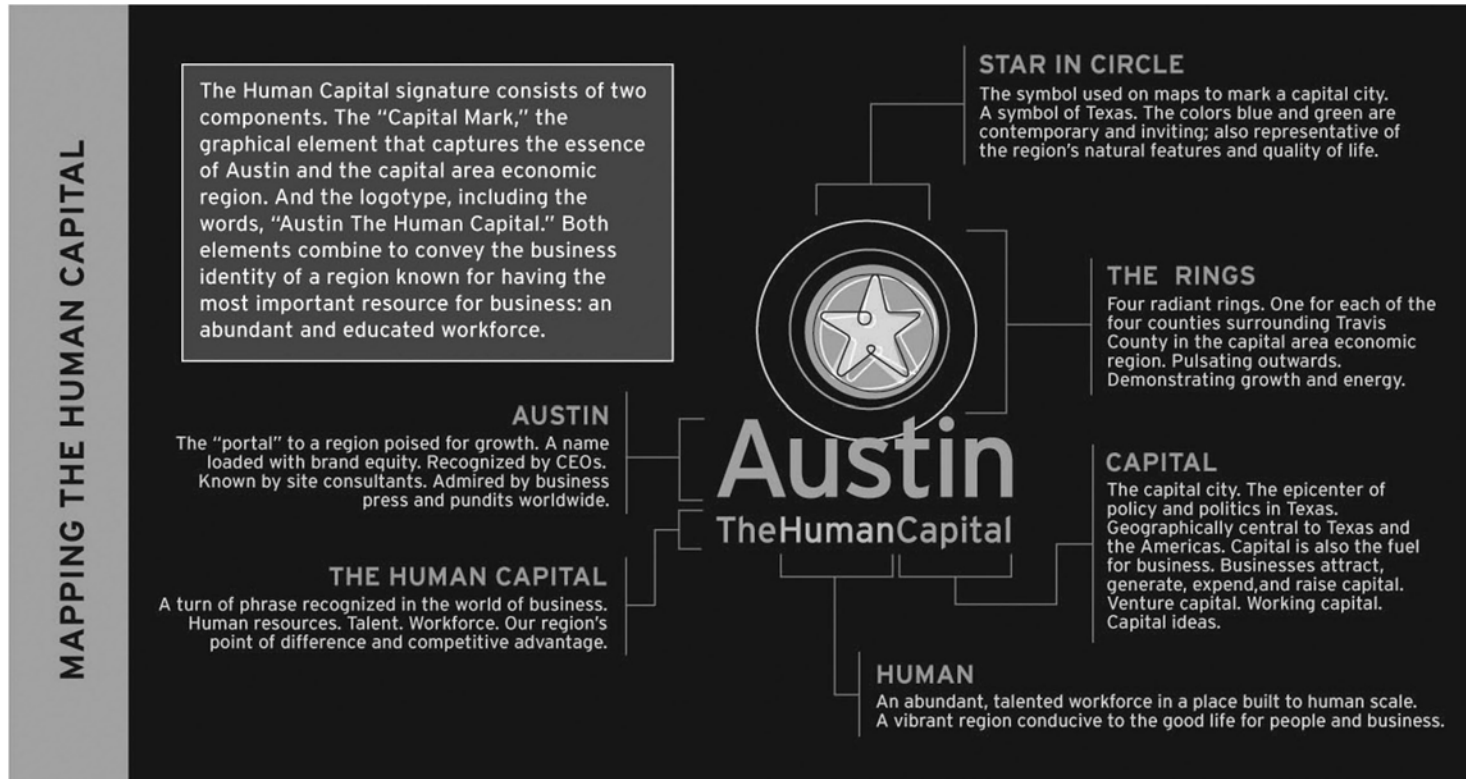


Chart 2



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people are employed. Hector Ruiz, AMD CEO, lives and works in Austin.

- Major operations for Samsung, the company's only semiconductor plant located outside of Korea. A 35,000-square-foot expansion of this plant will prepare the Austin plant to produce next generation nanoscale semiconductor technology.
- Wafer fabrication facilities for Samsung, Freescale, and AMD, with facilities each representing a capital investment of more than \$1 billion.
- In 1983, 3M Company, with five divisions headquartered in Austin and with 1,100 employees—the company's first headquarters operations away from Minnesota.
- In 1988/1989, site location decisions that led to major manufacturing operations for Applied Materials, the world's largest manufacturer of equipment for the semiconductor industry.
- Headquarters for the two research consortia dedicated to U.S. technological leadership, Microelectronics and Computer Technology Corporation (MCC) in 1983 and SEMATECH in 1988.
- National Instruments: University of Texas spin-off and a quiet, but major success story.
- More than 120,000 central Texans are employed by the array of technology research, development, and manufacturing companies and consortia, and many start-ups are serving as the basis of a homegrown economy.

World Knowledge Capital

Austin is second among the world's knowledge regions, according to a 2004 study conducted by Robert Huggins Associates. Important criteria include number of patents, IT manufacturing,

spending for education, and strong economic activity. Of the 740,000 people employed in the Austin metro area, approximately 120,000 work in technology industries. Such success in attracting technology research, innovation, and entrepreneurs led Presidential Medal of Science winner and renowned business thinker George Kozmetsky to label Austin a "technopolis, and one of few such regions in the world." Austin also has been accorded the title *the Human Capital*, indicating a strong pool of educated residents (and an ability to draw talent to Austin).

A HISTORY OF EFFECTIVE COLLABORATION

In 1983, Austin charted a distinctly new course. Before then, Austin had achieved some early success as an outpost for manufacturing operations notably IBM, Texas Instruments, Motorola, and Advanced Micro Devices. The groundwork was laid for what would become the next phase in Austin's economic development: positioning Austin as a center for advances in research, information, and technology.

The unusual opportunity was presented when Microelectronics and Computer Technology Corporation (MCC) conducted a national site selection search. An unprecedented venture, MCC was the country's first private sector, high-technology consortium. MCC chose Austin, after a vigorous national sweepstakes competition over 57 other cities in 27 states.

The key ingredient to Austin's victory was careful collaboration among government, business, and the University of Texas. The MCC experience dramatically brought these forces together, for the first time in Texas, to develop incentives and present a very aggressive bid. Among the key MCC participants were the governor's office, The University of Texas at Austin and its College of Engineering, and the Greater Austin Chamber of Commerce.

Gov. Mark White believed that winning MCC was critical to charting the future for the state in terms of new and emerging technology rather than continuing to rely upon oil- and gas-based economy. A statewide task force was created to focus on and ensure the commitment of financial resources and talent that MCC required. In a show of solidarity, Henry Cisneros, then mayor of San Antonio, threw his city's support behind Austin's bid when it was clear San Antonio could not be a finalist in the competition. Unselfishly, Texas A&M University and its engineering school stepped up to support and collaborate with The University of Texas at Austin.

Texas' bid for MCC, with more than \$20 million in incentives, raised and altered forever the stakes for such economic development competitions in the United States. Major incentives in Austin's bid package, among others, included: (1) a facility and laboratory on the University of North Texas campus leased for \$10 a year and financed by university and private statewide contributions; (2) the creation of 32 \$1 million endowed chairs in engineering and natural sciences; and (3) other benefits to MCC employees, including fellowships, teaching positions, and job-hunting assistance for spouses.

Neal Spelce, an Austin business leader, later summarized the dramatic impact on the sleepy college town of Austin. "The die has been so strongly cast in the direction of super-charged, high-tech economic growth that the economic significance of MCC's site selection decision of Austin may truly equate to the economic impact of state government and the university on the Austin area."

In early 1988, Austin again won a similarly much heralded national sweepstakes competition to become the site for a second national research consortium. SEMATECH, a consortium of most of the U.S. semiconductor manufacturers, chose Austin over 137 other competing cities. The MCC collaboration team, still in place, marshaled its resources, creating a new university research park in

South Austin (converting an unused Data General facility) and financing a manufacturing facility via the specially created Travis County Research and Development Authority. Once more, in 1988, Austin was picked as one of four finalists for U.S. Memories, another semiconductor manufacturing consortium that was not ultimately implemented. No other city in the world had fared as well with three big economic development competition prizes. The same collaborative team was in place. Success bred success.

ECONOMIC BLUEPRINT(S) OR STRATEGIC PLANS

In 1985 (after the MCC experience and sandwiched between the two big consortium wins), Austin *began to realize the true magnitude of possibilities*. The Greater Austin Chamber commissioned a new long-range economic plan that became the blueprint for Austin's economy. Stanford Research Institute International, known as SRI International (Palo Alto, Calif.), was retained to "tell us what we need to know, not what you think we want to hear."

SRI's plan charted a new direction for Austin, stressing, for the first time, the significant linkage between quality of life and economic development. Science and technology were at the heart of SRI's blueprint. SRI's recommendations included:

- Continuing collaborations among business, government, and educational institutions, especially the University of Texas—using the MCC experience;
- Creating a climate for science and technology innovation and start-ups by creating business incubators, encouraging spin-offs, and increasing venture capital availability;
- Developing programs to attract, recruit, and grow technology information firms (e.g., software, electronic publishing); and

- Providing training through educational institutions that is more aligned with industry.

Later, in 1998, the chamber commissioned the ICF Kaiser Consulting Group to conduct a similar review or study that led to the next economic blueprint that emphasized “industry clusters,” including information technology and software. By 2003, the chamber had retained yet another firm, Market Street, to perform a fresh economic analysis in the wake of the economic downturn that involved the technology sector, particularly Internet-related “dot.com” investments. At the time of this article’s publication, the business community has substantially completed raising \$11 million for an economic development program, *Opportunity Austin*. Now in its first year, it is a four-part strategy that includes the following efforts:

- Retain and assist expansion efforts of existing businesses;
- Recruit new businesses (this year), targeting automotive suppliers, medical products and pharmaceutical manufacturers, and wireless and company headquarters;
- Stimulate entrepreneurship and emerging technology sectors, such as biosciences, digital film and entertainment, and clean energy;
- Market Austin effectively; and
- Improve regional competitiveness.

With more financial support pledged than ever before, a truly regional collaboration model is the lynchpin of a solid future economy.

WHAT WERE THE KEYS TO AUSTIN’S SUCCESS?

Guided by a belief in the power of collaboration, Austin business and community leaders have

worked together on building the ongoing elements of the city’s success:

- *Capacity building.* Austin business, government, and university leaders have focused on building to capacity to compete for investment and jobs. Examples include:

- *Physical infrastructure* in the form of transportation (transit and roads), schools, and billions of dollars in city/county capital investments.

- *Intellectual infrastructure* as the university has acquired faculty, invested resources, and built facilities to house new laboratories and attract talent.

- *Capital formation infrastructure* in the form of venture capital funds led by Austin Ventures. Austin and central Texas did not have to make the long trek to Sand Hill Road any longer to beg for precious seed capital money for start-ups. At the height, in 2000, more than \$2 billion was being put to work by more than 30 venture capitalists in Austin. Today, there are about a dozen active venture capitalists who invested nearly \$400 million this past year. This is comparable to the national trend, which has seen an 80 percent drop in funding (\$100 billion to \$20 billion). Since 1990, a robust angel investor network also has contributed widely to start-ups through seed investing, catalyzed by the work of the Capital Network (now known as CN Group).

- *Smartly applied and focused incentives.* Well-designed, timed, and placed economic incentives have been crucial to Austin’s success. The largest money offer does not mandate a specific conclusion. Foremost, among them are those offered by the University of Texas, which have focused on:

- *Space and facilities* for research consortia and start-ups;
 - *Investments to accelerate research programs*, such as adding faculty endowments and advancing the schedule for the centers for microelectronics and high performance computing;
 - *Technology commercialization* and transfer with provisions to allow faculty to retain ownership in companies fostered by their inventions; and
 - *Incentives by city and county government* have focused on property tax abatement, utility rate agreements, special agreements (such as agreements not to annex and not to tax for a specified time), and expedited permits and construction approvals where time, in the semiconductor industry, is of the essence. Critically, there is a continuing need to demonstrate to a given industry sector that a community understands the sector's specific needs and challenges.
- *Climate for entrepreneurs and innovation.* Entrepreneurial successes are quite legendary in Austin. Michael Dell began PC's Limited (later called Dell Corporation) in 1984 in his dorm room, while he was a freshman at the University of Texas. Engineer Frank McBee founded Tracor in the 1950s, which eventually spawned a cluster of technology companies totaling more than 20 spin-offs, creating 5,467 jobs by 1985 alone. From these experiences, Austin leaders recognize the potential for start-ups and have supported them, accordingly.

- The Austin Technology Incubator (ATI), a part of IC² Institute, is a research institute at the university, with support from the chamber and business leaders and nurtures technology companies that have high-growth potential. Over the past 15 years, the

Incubator has graduated more than 75 companies, five of which have gone public, and generated more than \$1.5 billion in revenue and 3,000 direct jobs. More than \$720 million in external capital has been raised.

- While the early 1990s were a difficult time, as Austin experienced the fallout from the dot.com bust, the entrepreneurial spirit burns brightly. Austin leaders are working to reinvent and diversify the economy, having experienced the loss of 13,000 jobs in the dot.com aftermath. But the Austin community continues to recognize that the next waves of significant economic contributors will be advanced technology-based and generated companies, nurtured and researched in Austin. The commitment to encouraging and supporting entrepreneurial ventures remains strong.

- Austin is an "early adopter community" with an entrepreneurial spirit. Its entrepreneurs were early in the software boom, in the semiconductor boom, in the dot.com boom, etc. Austin rides the next waves, cresting and crashing with them, always rising with the next wave of technological enthusiasm. Indeed, Austin is clearly one of the leaders in creating the next wave (e.g., digital convergence technology).

- *Targeted marketing and recruitment.* The chamber has invested considerable resources in leading efforts to target and recruit companies and operations that would complement Austin's economy. Among current targets are next-generation semiconductor research and manufacturing, the wireless industry, nanotechnology, biotechnology, and software. While the chamber has provided the social memory and organizational glue, The University of Texas at Austin has been a ready partner with its ability to mobilize faculty, administrators, and a wide range of human and financial resources.

- *Natural resources.* In addition to its highly qualified human resources, Austin has been blessed with abundant supplies of water. Unlike some cities, which have faced constraints by limited water supplies, Austin has the benefit of the Highland Lakes, northwest of the city, to provide a plentiful, long-term source of water. In 1999, the city helped to ensure its water future by acquiring from the Lower Colorado River Authority a secure water supply for its customers for at least 50 years, even during a severe drought. Recognizing the long-term significance of the water agreement, then-Mayor Kirk Watson said: “There is probably no single factor more instrumental to the long-term health of a city—including quality of life, the economy, public safety, etc.—than the supply of water.”

WHAT’S NEXT FOR AUSTIN?

Big Challenges Ahead

The good news for Austin is that it has made legitimate progress (to be repeated over and over again) toward its strategic vision to become a globally-significant center for technology research, development, and business.

The bad news is that the task doesn’t get easier. It is imperative that Austin:

- *Compete nationally.* Competition among U.S. cities and regions as centers for technology development has stiffened. The same incentives that set a new national standard and raised the bar in 1983 would not be adequate today. To attract and encourage expansion of technology industries, cities, regions, and states now routinely offer financial incentives that would have been considered extraordinary just a few years ago.
- *Compete globally.* The pack of cities and regions competing for jobs and investments is stronger and more global, with more financial resources.

They are prepared to and do offer sizable economic incentives.

- *Continue to attract the “creative class.”* People in the creative class can be defined by innovation. They are an elusive target because they are mobile and are comfortable with relocation. They easily can be lost if not carefully nurtured by their community.

- *Provide opportunities for local residents.* UT Austin’s enrollment is capped, and central Texas’ population growth challenges the capacity of area colleges and universities. More job-training programs still are needed. With jobs increasingly requiring advanced skills and education, Austin and central Texas are challenged to ensure that its local residents have a chance for the best employment opportunities. To avoid leaving behind local residents in the technology and information sectors, Austin’s social and educational institutions—public schools, community college, and job training organizations—must realign to prepare and train residents for actual jobs.

- *Plan to accommodate urban growth* (envision central Texas). A community discussion has been triggered without resolution about the future of Austin and its urban land planning. Land use and environmental land regulation remain among the most hotly contested local political issues today. A creative tension over these issues, despite some angst, does help to ensure a higher quality of life. For Austin to continue to succeed in science and technology and research and development, it must develop a true urban master plan or adopt a decision process, which allows the city to accommodate new technology growth in a way that does not compromise the persistent quality of life—however defined.

Fortunately for Austin, The University of Texas at Austin continues its strong institutional commitment and partnership. Its contributions to technology and economic development—both strong initiatives in recruiting research and devel-

opment, accelerating schedules for research programs, commercializing technology, incubating technology businesses, and supporting several research parks in Austin—are valuable, long-term commitments. Clearly, The University of Texas at Austin is a vital catalyst and continuing force in Austin’s long-term economic development.

- *Expand and protect water supplies.* The six-county area around Austin (Bastrop, Burnet, Hayes, Lampasas, Travis, and Williamson) is expected to grow from 1,269,478 people in 2000 to 2,301,156 in 2030, according to the U.S. Census Bureau and Texas State Data Center. This growth will put pressure on the existing infrastructure (roads, utilities) and will require significant expansion of water and wastewater utilities in the six-county area to sustain the quality of life that has attracted many businesses and families to the area. In the early 1980s, when Austin was undergoing significant growth, some people felt that the way to stop growth was to oppose funds for expanding the utility infrastructure. The tactic backfired. Inadequate wastewater treatment facilities polluted the river, and farmers downstream claimed that their cows would not drink the water. The city came under attack from the state, environmental organizations, and downstream communities. Fortunately, the city cleaned up its act and the river. That lesson must be told over and over again, so the same is not repeated.

For Austin, *the Human Capital*, to achieve its long-term economic development vision, institutional commitments must be secured, renewed, and strengthened among all of the players critical to success: city and county government, the chamber of commerce and its economic development arm, businesses and industries, and other educational institutions at all levels. All have a direct and critical role in realizing Austin’s future as a collaborative center for technology and knowledge advances for the nation.

As an example, after the SRI report in 1985, Austin became a national center for software development with more than 500 software companies already present and employing 28,000 software developers. This does signal the successful execution of the information industry development program initially recommended by SRI. Finally, the magnitude of accelerated investments by the University of Texas exceeds \$165 million when endowments and new capital investment are totaled.

AUSTIN—YOU CAN CHANGE THE WORLD FROM HERE

On other technology fronts, Austin is driving the build out of a digital convergence future, where voice, data, and digital media converge on open wireless, broadband, and computing platforms. People throughout the world will connect using new devices, intelligent networks, and rich media. Austin’s semiconductor, software, and wireless knowledge combined with its digital media, music, video game, and motion picture industries offer a unique location to take advantage of the digital convergence revolution.

A world-class workforce, entrepreneurial spirit, and extraordinary collaboration among industrial, academic, and government sectors help decrease the time to market and build the bottom line. In the past, these same assets gave birth to the semiconductor and software industries in Austin. Digital convergence assets in Austin reach across the entire value chain from research and development to materials and chips, hardware, software, systems, and services.

A diverse economic mix and skilled workforce were key factors in *Business 2.0’s* ranking of Austin as one of the top four “Boom Towns” among 318 U.S. metro areas. In wireless alone that boom already has grown to nearly 100 significant companies in Austin, employing 4,000 people and more on the way.

COLLABORATION IS STILL ALIVE

Collaboration is still alive in Austin with the most recent and future innovations as driving forces in the future economy of the region. The semiconductor industry in Austin (Freescale, AMD, Silicon Labs, Vitesse, and several others) is experiencing rapid growth and higher margins in wireless products than in conventional integrated circuits. This will continue. The world only has less than 15 percent of our population on the Internet, and less than 4 percent of the world's population has high-speed (beyond dial-up) rates. This all will be built out wirelessly in the coming decade in countries like China and India, and third world nations.

WI-FI/TECHNOLOGY—COMMUNITY SUPPORT AND INVOLVEMENT

Austin's wireless cluster—numbering nearly 100 firms ranging from new ventures to names like Freescale Semiconductor, SBC Laboratories, and SEMATECH—has formed partnerships for collaboration. The Austin Wireless Alliance (AWA) is working with academic, business, and government sectors to develop, sustain, and promote Austin as a global leader in business activity, technical innovation, and community participation within the wireless industry. The AWA is a leader in the development and coordination of the major strategic wireless initiatives in Austin and the central Texas region. The AWA is composed of key leaders from all primary stakeholders in Austin, including the business, academic, community, and government sectors. The successful spread of strategic wireless initiatives in the central Texas region has stimulated the economic splash of much more.

- The Austin Technology Council's (ATC)—formerly the Austin Software Council—mission is to ensure Austin's position as a world renowned technology community, with outstanding

university-based research, an entrepreneurial culture, venture funding, a broad array of support services, and a rich pool of intellectual talent and leadership. The ATC is a member-driven association of more than 200 technology companies, business support firms, education institutions, and economic development groups. The ATC has a history of developing and providing the programs and services needed to support business growth. By focusing on companies that have emerged from the start-up phase, ATC brings together senior industry executives to share experiences, exchange ideas, and network. Sharing best practices is one of the ways emerging growth companies can create fast-track expansion. As the technology sector grew in Austin, the name of the organization was changed to reflect the growing interdependencies of software, silicon, and computing. Now, the increasing convergence in Austin of wireless, entertainment, and security technologies will build on this proposition, further positioning Austin as an emerging global technology business center, recognized for state-of-the-art innovation, creativity, and leading technology growth businesses.

- The Austin Technology Incubator is one of the most successful technical business incubators in the United States, and it is taking an active role in accelerating the development of wireless companies in Austin.
- The Austin Wireless City works to improve the availability and quality of public, free Wi-Fi in Austin.
- The Austin Wireless Group experiments with wireless protocols and promoting the expansion of wireless Internet gateways.
- The City of Austin supports wireless by deploying hotspots in public spaces and takes a pro-active approach with wireless stakeholders to plan the course of future wireless infrastructure.

- UT Austin's Digital Media Collaboratory (DMC) focuses on applied research projects, new interactive technologies, and digital content.
- The Future Media Institute is a workforce training collaboration focused on digital and wireless media.
- The Greater Austin Chamber of Commerce (Opportunity Austin) facilitates the growth of the wireless industry in the city through several economic development programs. The chamber holds a seat on the AWA governing council.
- IC² aims to establish Austin's national (or global) wireless presence and create opportunities for interregional networking for researchers, policymakers, and business professionals. IC²'s Austin's Wireless Future report maps Austin's wireless assets and outlines action items for regional development in wireless technologies and services.
- UT Austin's Office of Technology Commercialization is working to make UT Austin a leader in the arena of technology transfer and commercialization while creating a serious impact on the Austin and Texas economies.
- The World Congress on Information Technology (WCIT 2006) is the world's premier IT forum. The mission of WCIT 2006 is to be a catalyst for social and economic development through the exchange of policies, ideas, and technology. WCIT 2006 will provide unprecedented dialogue and networking opportunities with world leaders from Texas- and U.S.-based companies. An estimated 2,000 global leaders from business, government, and academia will attend WCIT 2006 to discuss IT policy, to learn about the future of technology innovation, and to drive social and economic development. Led by CEO Fred Mapp this global forum will be held in Austin from May 1-5, 2006.

- Wi-Fi Alliance is the international association that certifies interoperability of wireless products. It relocated its headquarters to Austin in 2004.

- The Wireless Networking and Communication Group (WNCG) at UT Austin is the largest wireless research center in the country. Because of WNCG's corporate-sponsored research programs for public-private research and development technology is coming to market faster. Dell is moving aggressively into wireless and recently has joined the WNCG Research Center.

BIOLOGY AND TECHNOLOGY MEET UP— IN AUSTIN

Austin is a metropolitan region of 1.4 million people that thrives on a balance of technology, business services, education, and government. As the geographic center of Texas and the home of The University of Texas at Austin and the University of Texas System, Austin is the technological driver for biomedical and pharmaceutical innovation around the state. With its highly trained workforce, well-recognized quality of life, and vast experience in manufacturing, research, and development, Austin can serve the needs of the medical device and pharma industries in a unique way. Today, the Austin region boasts approximately 85 companies in the medical product, pharmaceutical, or bioscience areas. Located in Austin, the Texas Healthcare & Bioscience Institute (THBI) is composed of biotechnology, medical device, pharmaceutical companies, universities, and private research institutions, as well as companies that provide goods and services to core organizations.

The purpose of THBI is to promote health care and bioscience research, development, and manufacturing in Texas. THBI accomplishes this by developing solid information about the health care technology community in Texas, and making that

information available to political leaders, the news media, venture capitalists, investment bankers, and the public.

Already, THBI has demonstrated that medical research and manufacturing are major contributors to Texas' state and local economies—with great potential for financial growth and job creation. The Texas Workforce Commission reports that the state is home to 121 pharmaceutical manufacturing companies and 1,715 firms involved in research and development in the physical, engineering, and life sciences. These companies and their partners in academic institutions are developing hundreds of new products to improve treatment for all major diseases, as well as using biotechnology principles to solve agricultural and environmental problems.

By demonstrating a firm correlation among the biomedical industries, universities, and research institutions, THBI assures potential investors that dynamic entrepreneurship in Texas is complemented by some of the world's finest scientific minds. At the same time, THBI affords the Texas medical research and manufacturing community unparalleled grassroots opportunities to communicate effectively with elected officials.

GETTING YOUR ACT TOGETHER: SIMPLE RULES OF THE ROAD

Austin has faced important economic challenges. How can the city assure that it continues leadership in the highly competitive global sphere of advanced technology research and manufacturing centers? How can collaboration among organizations be institutionalized to ensure continued success as individual leaders change? The city's success in science and technology owes much to the faithful, "can-do" execution of long-range strategic economic plans. The first was developed in 1957, followed by the second in 1984-85, third in 1998, and the fourth in 2003. Perhaps the key economic question for Austin continues to be: How the

five-county region, *the Human Capital*, can stay on course with its long-range plan and fully realize its vision as a global center in new science and advanced technology development.

HOW DOES AUSTIN CONTINUE TO REINVENT ITSELF AND ITS PUBLIC/PRIVATE INSTITUTIONS?

Quality of Life

What better balance can a city offer than being both the "Best Place for Business and Careers" and the "Live Music Capital of the World?" Austin placed well in rankings ranging from "Best City for Relocating Families" to "Best Cities for Singles." Other assessments consistently recognize the region as among the most inventive, creative, wired, educated, fit, and loved.

- Affordable and diverse neighborhoods, from urban lofts to hill country estates,
- A climate made for outdoor enjoyment and recreation nearly year-round,
- Many professional and amateur sports venues and events, and
- More fine restaurants and clubs per capita than any other U.S. city.

Workforce—Young, Creative, and Productive

Fast growing, largely because of its draw as a destination for migrating talent, metropolitan Austin's population reached 1.4 million in 2003.

The 1990s saw a 47 percent increase in population, and growth has been averaging 3 percent annually since the *2000 Census*. The *Census* indicated that only four U.S. metro areas saw greater total net migration than Austin between 1995 and 2000. The median age of the Austin metro area is four

years younger than the national median (31.8 years vs. 35.9 years). Nearly half the metro's population, 47 percent, is the working age between 18 and 44 (compared to 39 percent nationally).

Workforce Training Resources

The Austin area features several organizations and training providers including Bio-Link at Austin Community College, the Capital Area Training Foundation, and WorkSource. These organizations have developed customized training programs for high-tech industries including biotechnology. The Austin area workforce training community has shown a unique ability to adapt to the training needs of the private sector and has funding systems in place to support the changing needs of business in the future.

Ask CEOs, entrepreneurs, educators, and research why the Austin region has stayed hot through more than two decades of business trends,

and the one common theme is workforce. It's all about people, and Austin's supply of unmatched employee talent is certainly no accident. As the business and government epicenter of Texas, Austin is a highly efficient workforce generator—*the Human Capital*.

Education

The Battelle Institute's latest state-by-state assessment of bioscience initiatives showed that Texas is one of the leading states when it comes to bioscience education. Texas ranked second in the nation for the number of bioscience graduates and ranked third for university expenditures in biosciences. Within a 100-mile radius of Austin, one will find 25 colleges and universities, including a world-class research institution, The University of Texas at Austin, the nation's largest public university—previously described and appreciated for its key impact role.

Highly Educated Talent		
Educational Attainment of Persons 25 Years and Older, 2002		
	Austin MSA (Percent)	United States (Percent)
College Graduates	38.4	25.9
High School Graduates	86.2	82.6
High-Tech Employment Base		
Employment in High-Tech Industries, Fourth Quarter 2003		
High-Tech Manufacturing	34,513	
Health Services	45,620	
Information	20,455	
IT Systems Design and Services	9,718	
Engineering	8,020	
Research and Testing	3,892	
Total	122,218	

The University of Texas at Austin

Since its creation by constitutional mandate in 1876, The University of Texas at Austin has evolved into one of the most distinguished research universities in the country. With 14 Colleges and 333 degree plans, UT Austin has kept a strong research focus in engineering and mathematics, as well as the physical, biological, and computer sciences.

Annual research expenditures at UT Austin exceed \$320 million. Federally funded research and development expenditures in FY 2002 were approximately \$220 million, placing UT Austin second in the nation in federally funded research among universities without a medical school.

The university ranks in the top 10 for the number of science and engineering doctoral degrees. UT Austin's world-class programs include bioengineering, nanotechnology, bioinformatics, and pharmaceutical research. UT's College of Pharmacy is one of the premier institutions of pharmaceutical education and research in the country. The university supports more than 90 organized research units. A sampling of those impacting Austin's future in bioscience technology development and commercialization include:

- The Department of Biomedical Engineering
- The Center for Biological and Medical Engineering

Austin Metro Area Colleges and Universities, Fall 2002 Enrollments

Four-Year Institutions	
The University of Texas, Austin	52,261
Texas State University, San Marcos	25,025
St. Edward's University, Austin	4,266
Southwestern University, Georgetown	1,260
Concordia University, Austin	1,045
Hutson-Tillotson College, Austin	642
Total	84,499
Austin Community College	29,156
Grand Total	113,655

Degrees Awarded in Selected Science Fields, Austin Metro Area Institutions, 2002

	Bachelor's	Master's	Doctoral	1st Professional
Agricultural Sciences	25			
Biological/Life Sciences	640	35	39	
Computer and Information System	454	80	12	
Engineering	816	431	136	
Physical Sciences	169	45	73	
Health Professions	409	193	31	109
Total	2,513	784	291	109

- The Center of Molecular and Cellular Toxicology
- The Microelectronics Research Center
- The Center for Nano and Molecular Science and Technology
- The Institute for Cellular and Molecular Biology
- The Institute for Computational Engineering and Sciences
- The Institute for Neuroscience
- The Institute for Theoretical Chemistry

Infrastructure

Austin boasts proven telecommunications, transportation, electric, and water capacities to satisfy diverse operations ranging from sensitive data center operations to semiconductor manufacturing, as well as Fortune 500 firms and international businesses. A major metro economy, combined with the seat of Texas government, also means Austin businesses enjoy world-class business services in legal, accounting, and public relations. The University of Texas at Austin supplies businesses with the fundamental framework for innovation and growth.

A NEW START FOR A NEW CHALLENGE

The United States faced a national competitive threat in the 1980s when the Department of Defense and private industry collaborated to create the government-industry consortium, Austin's SEMATECH, which is widely credited with regaining U.S. leadership in semiconductors. Joint government and industry have invested around \$3 billion in SEMATECH programs and facilities. The United States must transform this success model to address converging advanced technology R&D challenges.

Our solution to stay the course is the Texas Technology Initiative (TTI), located in Austin. TTI was established in 2002 as yet another collaboration among the government, academia, and private industry. Austin (and Texas) has been challenged to a new start, most notably by New York, Europe, and Asia, to reinvent, redefine, and improve the Technology Collaboration Model.

In response to the TTI strategy and the need to be globally competitive with incentive programs, the state of Texas created a \$295 million Enterprise Fund, under the leadership of Gov. Rick Perry, that led to the retention of SEMATECH and the creation of Advanced Technology Development Facility (ATDF) and the International SEMATECH Manufacturing Initiative (ISMI). Successes followed with the co-location of Advanced Processing and Prototyping Center (AP²C) and the operational Advanced Materials Research Center (AMRC). The co-location already has received industry- and university-matched \$40 million from the Enterprise Fund.

The Texas Technology Initiative will provide a cost-effective, leveraged technology platform available to advanced technology innovators in conjunction with a unique, world-class 300mm/200mm semiconductor capability. TTI also will provide support for advanced integrated technology research programs in nanotechnology, microelectro-mechanical systems (MEMS), biotechnology, IT/wireless, photonics, energy, and other emerging technologies. It will retain and expand targeted corporate R&D and manufacturing with direct high-tech jobs in the region and will accelerate commercialization of emerging Technology research.

The Human Capital's National Technology Initiative (NTI) will provide unique, leading-edge processing and prototyping universities; a cost-effective, leveraged technology platform available to advanced technology innovators; and a completely unique, world-class 300mm/200mm capability. NTI will support advanced integrated technology research programs in MEMS, nanoelectronic

mechanical systems (NEMS), biotechnology, and other new and emerging technologies. It will retain targeted corporate R&D and manufacturing with direct high-tech jobs in this country and will ultimately accelerate commercialization of emerging technology research—a true convergence of advanced technologies (the waves of the future crashing in true Austin tradition).

CONCLUSION

The critical issues necessary to make an economic development plan work (hum) are as follows:

- 1) *College education ranks*—the power of knowledge cannot be underestimated. A skilled workforce will aid in the development of an area. An area with a well-ranked college is proof of a pool of skilled workers.
- 2) *Science/technology*—Texas slipped from 13 to 24 in this year's *Milliken Report on Technology*.

It happens fast. The telecom corridor in Richardson, Texas, evaporated before our eyes. Staying on top of the game is vital and slippery. Colorado is the only truly competitive state in the Midwest. Pay attention to this annual report. Get a copy and read it carefully. It is a valuable yardstick.

- 3) *The economy is cyclical*. There always will be booms and busts. Try to be as comfortable with it as you can and be patient. Things do not happen overnight.
- 4) It takes *sweat, blood, tears, and luck* to just stay in the game. A lot of hard work and luck will help a regional community become a thoughtful part of the future economy.
- 5) *Most magazine and book ratings* or other ratings lists are fine, but be wary of them as applause can hide structural flaws in a program. Enjoy

them briefly, and let them pass. They are not a grounding basis for successful economic development, but they can be a part of the outcome.

- 6) *Technology changes*—the speed of change is dramatic. One half of all we know occurred before 1950, and the rest has been discovered since that time. The pace continues to quicken every day.

AUSTIN HAS DARED TO DREAM AND DREAM BIG

Will you join us?

- 1) Have a *long-term strategic plan* and stick with it—through thick and thin (and ups and downs).
- 2) Always *press the envelope* do not be content to sit on the status quo answers from academia, research and developers, etc. What are the next, and the next, and the next big things to change the economy of your region? There is always something new on the horizon. Do not be the last to know. Disrupt.
- 3) *Be bold*—ignore the pundits who say, “It cannot be done. That won't work.” Press on. Those who make history move forward in spite of the appearance of obstacles. There is always a way around an obstacle. Find it.
- 4) Support the *bonding of key players*—through shared experience(s). Economic development competitions bear a striking resemblance to boot camp experiences—creating a positive memory track for participants. Participants will develop a bond that will strengthen the group and the overall process. Every good community has lasting and valuable ties.
- 5) *Celebrate* the good news and the victories (even the small ones). Promoting teamwork keeps spirits high. Those involved will be

stronger during the tough times if they celebrate the high points when possible.

WHAT DOES THIS MEAN FOR THE REST OF US?

What is the value of the Austin experience for the Kansas City Federal Reserve Conference Midwestern states attendees? The ingredients of successful economic development *must* include bright people, a willingness to change course as technology progresses, a commitment to advanced technology-based research, a team spirit that leaves private agendas at the door, a strong university/academic presence, and a passion about the intrinsic value of getting the job done. These values do not and will not change with geographic location. Educate. Adapt. Innovate. Collaborate. Find the strengths in your regional community and elevate them to new levels. Take a gamble. Risk your time and energy for the potential payoff of a solid future. The real risk is in not acting, not collaborating, and assuming that a good economy is not a product of hard work and great risk.

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