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Building a 21st Century Nebraska



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Introduction

In 2000, a partnership composed of Fannie Mae, Nebraska Chamber of Commerce and Industry, Nebraska Department of Economic Development, Nebraska Development Network, Nebraska Diplomats, Nebraska Economic Developers Association, Nebraska Investment Finance Authority, Nebraska Municipal Power Pool, Nebraska Public Power District, and Omaha Public Power District commissioned Deloitte & Touche Fantus to conduct a targeted industry study for Nebraska. Deloitte & Touche Fantus was charged with identifying business clusters that make sense for Nebraska and that meet four criteria:

- Have greater than average capital investments
- Are growth industries
- Have greater than average payroll and benefits
- Produce products or services that are high value-added

The Deloitte & Touche Fantus study, available on the Department of Economic Development web site, neded.org, identifies six business clusters. Three of the clusters deal with maintaining existing Nebraska strengths: agribusiness, metal products manufacturing, and financial services. The other three provide areas of growth opportunity focused on the knowledge-based economy: biotechnology, electronics manufacturing, and information technology/software development.

For Nebraska to successfully develop the targeted industries, communities within the state must have the infrastructure to support growth. Governor Johann's initiative encourages communities to develop an inventory of pre-zoned, ready-to-build sites and ready-to-occupy industrial and commercial buildings. This document identifies the physical and support infrastructure necessary for the development of **suburban technology parks**.



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Goal

The Nebraska Department of Economic Development (NDED) is providing high-level site standards for industrial/business parks in Nebraska. This document identifies characteristics for **suburban technology parks**.

The State's objectives for this Metropolitan Region study are:

- Assist in the development of an inventory of "shovel ready" sites that can be strategically marketed to targeted industries.
- Define what makes a park attractive for a wide range of site seekers.
- Develop a set of general standard characteristics for parks that help define "attractive" real estate opportunities for technology-related manufacturing and white collar industries

Approach

- This study focuses on site-related criteria. There are many non-site decision-making criteria that will be considered during a site search including workforce availability, quality, cost, business climate, incentives, quality of life, regional disaster potential, taxes, etc.
- This analysis assumes that the business already will consider a suburban Nebraska metropolitan area location. An available site by itself will not change this aspect of a company's location strategy.

Format

The suburban technology park profile is a different format from the other business and industrial park profiles published by the Department of Economic Development as part of the Building a 21st Century Nebraska Initiative. The suburban technology park profile combines the Deloitte & Touche Fantus format developed for the Rural, I-80, and Industrial Regions with a position paper supporting the need for technology parks in



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metropolitan Nebraska. The suburban and urban technology park profiles were developed by NDED without the assistance of Deloitte & Touche Fantus.

Types of Suburban High Tech Parks

There are three types of suburban business technology parks¹:

- Self-contained suburban campus such as the Microsoft campus in Redmond, Washington, and the ConAgra campus in Omaha, Nebraska,
- High tech office and manufacturing parks composed of one and two story buildings with large floor plates, surrounded by landscaped grounds with ample parking. Probably the most well known examples are the Research Triangle in the Raleigh-Durham Region of North Carolina and San Francisco's Mission Bay area.
- Suburban downtown developed for high tech companies through clustering activities such as the recent redevelopment of Bellevue, Washington into a high tech center. The new suburban downtown concept may well provide the next generation of offices for high-tech firms. The design is pedestrian friendly, including up to 20 ft. wide sidewalks, meandering sidewalk and street patterns leading to little courtyards and storefronts, and connectivity to a regional trails system that allows both recreational activities and bike to work access. This concept encourages rehabilitation of old retail, warehouse, and light industrial space for technology centers.

This paper will focus on the high-tech office and manufacturing parks, although the suburban downtown concept offers some potential for a select group of Nebraska communities.

Suitable Areas in Nebraska

Not all regions of Nebraska are suitable for the development of a true technology park. From the Deloitte and Touche Fantus study, the Metropolitan Region counties of Lancaster, Douglas, Sarpy, Dodge, Washington, Cass,

¹ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.



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and Saunders have the physical, educational, and support services infrastructure to support the development of tech parks. Omaha, Lincoln, and the I-80 corridor between the two metropolitan areas have the infrastructure necessary to support one or more technology parks and provide an easy commute to Nebraska's major research institutions. Other communities in Nebraska such as Kearney, Ogallala, Aurora, Scottsbluff, Fremont, and Beatrice may have the ability to develop a modified version of a true technology park.

High technology company founders and employees have a lot to say about where a company locates. For example, a study of the biotechnology industry in Washington State found that the single most important factor in locating biotech firms was that the founder or CEO wanted to live in the area.² Another consideration for start-up technology companies and those involved in mezzanine financing is locating where the venture capital sources are located, while other location decisions are driven by proximity to research institutions. These factors would indicate that a "grow your own" strategy including commercialized innovations, incubation, and local financing should be a major focus in developing high-tech clusters.

High tech manufacturers as a group favor suburban locations. Land and buildings are available at a lower cost per square foot in suburban park environments as compared to urban settings. In addition, the suburban locations are better tailored to their needs and desired images than traditional industrial parks, which tend to be dominated by older operations such as machine shops, woodworking establishments, distribution centers, metal products manufacturers, and cement or concrete operations.³ A notable exception to this are firms that have both research and development as well as manufacturing functions. In such cases, mostly biotechnology, laboratory research is located in urban centers while manufacturing occurs in suburban parks.⁴

While there are some examples of firms that have moved from suburban to urban locations and vice versa, most want to stay in the environment they know best. Horizontally housed firms tend to stay horizontal.

² Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.

³ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.

⁴ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.



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Vertically housed firms tend to stay vertical. Vertically housed firms tend to locate in urban, downtown settings. Horizontally oriented firms tend to locate in suburban settings.

Four business clusters of the Nebraska Targeted Industry Study are natural fits for suburban technology parks: financial services, software development and related information technology services, electronics manufacturing, and biotechnology, primarily pharmaceuticals and neutraceuticals for both human and animal uses. Local university and private sector research and development are occurring in all four areas, plus a significant cluster of all four industries already exists in Nebraska's Metropolitan Region.

A Case For Suburban Technology Parks In Nebraska

High tech industries are the fastest growing industries in the U. S. economy, and to a large extent, these clusters or groupings of high-tech industries are really determining which areas are succeeding and which are failing. Without growth in high-tech, many areas risk being left behind in the new economy.⁵

Prior to the terrorist attack on the East Coast of the United States, Nebraska had *not* been matching the job creation and personal income growth that other states in our region, as well as the nation as a whole, had been experiencing. This was mainly due to a lagging development of high-tech industries in the non-metropolitan regions of the state. The current national and world-wide economic downturn has slowed the growth in all states and has provided Nebraska the opportunity to complete the infrastructure necessary to compete on a global basis for technology sector job growth. To facilitate the technology sector growth, it is time for the metropolitan areas of Nebraska to develop one or more technology parks of significant size (600 to 3,000 acres).

A whole host of elements must be in place to set a region's economic growth in motion. The dynamics of high-tech clustering follow a fairly predictable pattern. Basic economic factors often play into the equation. Increasing returns to scale lead to competitive advantages like specialized labor skills, supplier networks, and

⁵ DeVol, Ross C., "Remarks, A-T Medical Research Foundation," Milken Institute, Santa Monica CA, March 21, 2000.



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technology spillovers. Such beneficial externalities play an important role in high tech industries.⁶ Most, if not all, of those elements are already in place in the Omaha-Lincoln metropolitan region for technology companies in the fields of data processing, software development, financial services, human and veterinary biomed, and electronics manufacturing. The development of one or more technology parks of significant size will support the continued job growth and investment in these sectors.

High-Tech Service vs. High-Tech Manufacturing

Because of the high value-added production in the technology industries and the greater demand for high-skilled labor, these industries compensate their employees well. The indirect effect from the high-tech industries on metropolitan economies is substantial.⁷ The evolution of the American high-tech economy from manufacturing toward services plays to the Omaha-Lincoln region's strengths. With the notable exceptions in the communications equipment and component electronic parts manufacturing sectors, Nebraska missed the decade of the 1990s boom in the hardware sector. Instead, Nebraska's strength has developed in the services side of the high-tech economy. The high-tech services sector is the high margin sector that continues to grow while the electronics manufacturing sector is in recession. The Metropolitan Region's development of a competent, qualified high-tech workforce has positioned it well as a technology center for the 21st Century.

Technology service firm's key source of competitive advantage is the intellectual capacity of its workforce. The firms' product is the knowledge of their employees, with this knowledge and innovation capacities of human capital being the core of the new economy. Technology firms will cluster in regions where knowledge workers are both grown locally and imported with general ease.⁸ Excellent degree and certification programs must be available that are producing a qualified, employable workforce. In addition, the quality of life and job opportunities must be such that those workers are staying in the area. Without an existing base of technology workers and technology-based businesses, it will be very difficult to attract additional skilled employees. The region's ability to retain and attract technology workers is essential to sustaining high-tech firms. These workers are talented individuals who are highly mobile. They are also highly compensated. They will reward those regions that attract and retain them.

⁶ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.

⁷ Milken Institute, Md30 Summary, Santa Monica CA, 2000.

⁸ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999



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Service businesses benefit more than manufacturing businesses from geographic clustering. Skill sets are very portable. The skills that a technology-based employer may need today most probably are not the skill sets the employer needed months ago. Geographic clustering allows workers with specialized skills to literally walk across the street to find a new job. At the same time, employers can fill important vacancies without suffering extended and costly searches, even though they may occasionally lose key personnel to competitors⁹.

When the Department of Economic Development was conducting its 2000 Targeted Industries Study, regional focus groups were asked what it takes to retain their 18 to 25 year olds. The response was that it takes:

- Good jobs that provide good wages and benefits,
- Challenging jobs that appeal to that age group,
- A quality of life that includes a host of non-employment, recreational, spiritual, and civic activities,
- Peer activities, including both peer age group and peer employment group activities (25-30 year olds want to interact with others in that age group. Techies want to interact with other techies.)

The technology service sector supports a younger workforce. That workforce will seek regions that can provide those characteristics described in the previous paragraph. In addition, it will be attracted to communities that embrace a technology mindset. This includes a general community philosophy that:

- Embraces the mixing of new ideas, talent, capital, and technology,
- Supports research and innovation as the raw materials for business success,
- Facilitates speed to action, eliminating impediments that will doom ideas or business decisions to failure,
- Values knowledge,
- Embraces globalization and supports global content and global linkages,
- Encourages entrepreneurial spirit over risk and failure,
- Is centered on collaboration and strategic alliances,
- Provides access to risk capital, and

⁹ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.



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- Provides an overall atmosphere that allows businesses to operate in a fiercely competitive environment.¹⁰

Regions that truly embrace this philosophy have the foundation for growing and retaining a world-class technology workforce.

Average Compensation

The jobs provided by businesses targeted for true technology parks provide excellent wage and benefit compensation packages. Of Nebraska's targeted industries for technology parks, only the low end of the electronic components manufacturing sector pays below the national average in compensation. The electronic components industry is only a support industry for further assembly in the telecommunications and electronic devices industries, which are the true electronic manufacturing targets for the technology parks and which pay considerably better than the electronic components industry. The targeted industries tend to provide compensation between 120% and 200% of the national average. Excluding electronics manufacturing, the workforce is mostly comprised of professional or certified staff. Electronics manufacturing tends to provide living wage jobs for a blue-collar workforce that does not have a college education.

The support industries that develop around the high-tech companies also provide excellent compensation. These include computer and IT maintenance, legal, accounting, advertising, and engineering and architectural services; typically white-collar jobs.

Importance of Ready To Go Industrial and Commercial Sites

This paper considers the entire Metropolitan Region as one community when determining the support area for one or more technology parks of significant size. The region must have the available real estate product in order to compete. Site location decisions are made quickly. Communities without available sites or

¹⁰ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.



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communities whose available sites have shortcomings will not even get in the running for location considerations.¹¹

Many elements go into a decision to locate a facility, including operating environment, labor market, operating costs, and real estate product. Communities, or in this case regions, need to know their strengths and weaknesses. The strengths need to include available, ready to go product including sites and buildings.¹² Most high-tech companies will consider a location in a technology park; however, communities also need to be prepared for those companies that will prefer individual, stand alone sites.¹³

Companies become frustrated when looking to site a facility and only finding unsuitable properties. Communities should perform detailed site assessments and address potential shortcomings before courting high-tech companies. Because of today's speed to market, which is especially true for technology based companies, site infrastructure needs to be in place for sites to be immediately ready for building.¹⁴

A community or region can position itself to provide real estate solutions when a company comes along. However, if the community must take time to prepare a site and competing communities or regions have ready-to-go sites, that project will locate in a competitor community.¹⁵

Traditional vs. Technology Location Factors

Low business costs may not be as critical in determining the location of firms in the information age as they were in the industrial age, but they can be a comparative advantage.¹⁶ Within the technology business clusters, the traditional cost of doing business factors will be of more weight in the decision-making process for

¹¹ Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.

¹² Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.

¹³ Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.

¹⁴ Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.

¹⁵ Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.

¹⁶ Milken Institute, Md30 Summary, Santa Monica CA, 2000.



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manufacturing, more mature companies, and IT/software companies with a large workforce of non-IT staff, such as back office service centers.

For high-tech companies, other factors are becoming more vital. They include access to a trained/educated workforce, close proximity to excellent education facilities and research institutions, an existing network of suppliers, availability of venture capital, climate, and the general cost of living, especially home prices.¹⁷

What attracts and sustains high tech industries¹⁸

- Existing high tech presence
- Traditional cost of doing business factors
 - Tax structure
 - Compensation costs
 - Space costs
 - Capital costs
- Specialized to high tech
 - Proximity to excellent education and research institutions
 - Access to venture capital
 - Educated workforce
 - Network of suppliers
 - Technology spillovers
 - Climate
 - Quality of life

Although the traditional cost of doing business factors are important, technology-based companies may consider the omission of the factors in the second group as fatal flaws, eliminating the community or the region from consideration.

¹⁷ Milken Institute, Md30 Summary, Santa Monica CA, 2000.

¹⁸ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.



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Research Facilities and Institutions

Research facilities and research institutions engaged in cutting-edge work are important pre-conditions to the creation of high-tech clusters.¹⁹ High-tech companies are searching for new ideas, new developments, and new technologies that will keep their products or services state-of-the-art or assist in creating the next “killer app.” The successful research institution is judged by its history of technology transfer, moving the research from pure research to applied research to commercialization. It is not just about conducting technology research, but its commercializing the research that takes place in universities, starting new firms, new ideas, spinning them out into the private sector that is important.²⁰ A region’s economic success is linked to its ability to translate research into innovations that result in new technology firms being established and grown. The most promising application industries (communications, biotechnology, biomed, and electronics) can be key partners in the labs and universities involved in research.²¹

Centers of innovation give their host regions a distinct competitive advantage.²² For example, Stanford University certainly deserves much of the credit for Southern California’s tech cluster development for providing the correct environment for commercializing research and encouraging entrepreneurial risk-taking.²³ Associations, business organizations, and some of the best specialized consulting firms were developed.

The Metropolitan Region is developing the research base that can attract high-tech development. The University of Nebraska system has made major steps forward through research centers such as the Beedle Center, the JD Edwards Center, the Peter Kiewit Institute for Information Science Technology and Engineering, and the University of Nebraska Medical Center. Creighton University is also gaining national recognition with its

¹⁹ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.

²⁰ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.

²¹ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.

²² DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.

²³ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California’s Economy, Milken Institute, Santa Monica CA, October, 1999.



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Rickets e-Commerce Center. The critical mass for research activity is being reached, although more work needs to be done on moving the research to commercialization.

Entrepreneurial Programs

Economic growth in the knowledge age will be heavily based upon the region's stock of human capital and its ability to translate that capital into innovations resulting in new technology firms being established and grown.²⁴ Development of high-tech industry clusters is not so much an attraction game as a coordinated effort for a region to grow its own high-tech companies. The region needs to embrace entrepreneurial programs at the college, university, and even K-12 levels, plus needs to develop incubators to assist in new business development. Ultimately, the region's economic livelihood is inextricably linked to whether it can continuously incubate and develop new technology firms.²⁵

The Metropolitan Region is making good strides in the high-tech incubation area. Incubators are in place associated with the University of Nebraska at Lincoln, the University of Nebraska Medical Center, and the Peter Kiewit Institute for Information Science Technology and Engineering. Lincoln's business park for technology transfer is developing. The Omaha business and higher education community has the vision and the financial backing to turn the old Aksarben racetrack grounds into a technology campus, including incubator facilities for both information technology and biomed.

Venture Capital

Access to venture capital does not always garner the attention it deserves. Access to venture capital is critical in incubating and sustaining an entrepreneurial-based high-tech cluster. By financing new ideas, venture capitalists are instrumental catalysts in maintaining or enhancing clusters. They provide a means for new firms to be formed. Without a well-functioning venture capital infrastructure in place, the region really risks not becoming a true high-tech center.²⁶

²⁴ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.

²⁵ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.

²⁶ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.



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In the move to a high-tech service economy, developing sources of venture capital is a critical development. These start-ups cannot walk to a bank for money or rely on corporate R&D budgets to fund their growth.²⁷

Access to venture capital is a major issue for technology companies in Nebraska. The state and the business community are taking steps to address the venture capital issue. In 2000, Governor Johanns formed a task force to evaluate the venture capital and angel network system in Nebraska. The task force returned a series of recommendations, the majority of which were incorporated into legislation which was passed in 2001 as the Venture Capital Forum Act. This legislation establishes a facilitation and education function between entrepreneurs, angel networks, venture capitalists, and investment bankers. Although only a first step, this forum should move quickly to address much of the high-tech venture capital needs in the state.

Industry Clusters

The industry clusters most likely to be attracted to a suburban technology park in Nebraska include:

- Computer software development (Information technology)
- Electronics
- Biotech
- Financial services & Data Processing
- Film production
- Indirect – support services
 - Computer and I.T. maintenance
 - Legal
 - Accounting
 - Advertising
 - Engineering and architectural services

²⁷ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.



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Manufacturing is in the electronics, biotech, and film production clusters. In general, high-tech manufacturers are most likely to be found in suburban industrial parks.²⁸ Biotech, in this case primarily pharmaceutical firms, tend to put manufacturing facilities in suburban industrial parks, although research and headquarters tend to locate in more urban settings and in close proximity to the regional research institutions. Software firms locate anywhere.

The high-tech service industry composes the balance of the target industries identified. The evolution of American high-tech economy toward services plays to Nebraska's strengths. Cost-of-doing business measures are not as vital to high-tech service firms as to high-tech manufacturers. Nebraska's transportation disadvantage from its relative isolation from population centers is not a disadvantage to high-tech service industries distributing services over the internet, by next day delivery, or through good air service for face-to-face customer visits.

Recession Resistance

When evaluating the high-tech businesses targeted for the suburban technology park, the region must consider the need to have a diversified business base balanced with the need to provide as much recession resistance as possible. Nebraska's economy has historically been driven by three industries: agriculture, manufacturing, and tourism. All three are extremely susceptible to economic fluctuations. The state needs to diversify its economic base, but should do so with a concentration of businesses that are least susceptible to recessionary fluctuations.

High-tech sensitivity to recession: most sensitive to least sensitive²⁹

- Computers and office equipment (SIC 357)
- Aircraft and parts (372)
- Guided missiles, space vehicles, and arts (376)
- Engineering and architectural services (871)

²⁸ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.

²⁹ DeVol, Ross C., Blueprint For A High-Tech Cluster. The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.



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- Search and navigation equipment (381)
- Electronic components and accessories (367)
- Measuring and controlling devices (382)
- Communications equipment (366)
- ---- Total economy sensitivity fits here ----
- telephone communications systems (481)
- motion pictures (781)
- computer and data processing services (737)
- Drugs (283)
- Medical equipment, instruments, and supplies (384)
- Research and testing services (873)

The Metropolitan Region targets for the high-tech industry (biomed, communications equipment, software development and information technology) are the high-tech businesses most resistant to recession.

Biotech/Pharmaceutical Manufacturing

The biotech industry most likely to locate in a suburban technology park is the pharmaceutical business. In Nebraska, that target will include both human and veterinary pharmaceuticals. The biotech industry's economic contributions are expected to increase substantially in the next several years because of the rapid pace of technological advancements, particularly in genomics. The application of information technology to biotech research is blurring the lines between biotech and information technology. Biotechnology and biomedicine are likely to be important microsystems application areas.³⁰

Biotech and biomed may mean to the first half of the 21st Century what electronics meant to the second half of the 20th Century.³¹ Most pharmaceutical development will come through a "grow your own" strategy. Large pharmaceutical companies are growing their product lines by buying smaller start-up companies that have

³⁰ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.

³¹ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.



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products in the final FDA approval stages, meaning that industry expansion will come from locally developing the next targets for large pharma. This grow your own strategy relates heavily to extensive university research at both the medical center and traditional university biochemistry areas. It also means there will be a big requirement to incubate start-up biotech companies. Venture capital becomes a huge issue. The process of moving drugs from an experimental phase through FDA approval and into production has a huge capital burn rate. Developing this industry will require establishing sources of venture capital plus establishing a process for developing specialized pharmaceutical manufacturing facilities through off-balance sheet financing. These specialized facilities can be expensive, \$500 to \$1,000 per square foot construction costs, and can take up to three years to complete the FDA permitting before becoming commercially useable. Once certified, the biomed facilities do not move and become an anchor facility for the community. A method for delaying the construction costs through favorable leasing arrangements needs to be developed. In addition to the large capital investment, pharmaceutical businesses typically require the types of services only found in metropolitan areas. In Nebraska, these companies will agglomerate in the Lincoln-Omaha metropolitan corridor.

For advanced technology manufacturers in fields such as biomedical products and medical instruments, affordable space is a priority along with access to housing that is affordable for a blue-collar workforce that builds the products. These characteristics lead manufacturers toward suburban locations that combine affordability for both the company and the workers coupled with a high quality of life.

Software Development/Information Technology

The vitality of the digital economy is grounded in IT-producing industries: the firms that supply goods and services that support the IT-enabled business process, the Internet, and e-commerce.³² Software development and information technology services are already a strength for the Metropolitan Region. These are also fast growth sectors of the economy. Software services industries include³³:

- Computer programming services
- Prepackaged software

³² Digital Economy 2000, US Department of Commerce, Economics and Statistics Administration, Washington DC, June 2000.

³³ Digital Economy 2000, US Department of Commerce, Economics and Statistics Administration, Washington DC, June 2000.



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- Computer integrated systems design
- Computer processing, data preparation, data processing
- Information retrieval services
- Computer services management

Many IT markets exhibit “network effects.” The more the technology is deployed, the greater its value. IT innovations can be applied across the economy and throughout the economic process. As a result, economic gains directly associated with improving capacity to obtain, process, and transit information mount up.³⁴

The Metropolitan Region is transforming itself to a largely high-tech service economy. This leaves the region well positioned as a technology center in the 21st Century. High-tech services including Internet-related activities, telecom services, software, and other related industries are growing faster than hardware, and, more importantly, are increasingly concentrating in large metropolitan areas. Data processing is increasing in importance as a target. The September 11th terrorist attacks on America brought a realization to many businesses that redundancy in data processing includes geographic separation of data processing centers. Although there is currently a glut of data center availability on both the east and west coasts, the geographic security of the Metropolitan Region coupled with its excellent telecommunication and electric power infrastructure will make the area a strong target for data center development. The Omaha area has already experienced strong data center development, including data center locations for MCI-Worldcom Network Systems, Qwest, First National Bank, PKI Systems, First Data Corporation, and ConAgra Foods.

Electronics

Electronics manufacturing provides a base of employment for living wage jobs for people who do not have a college education.³⁵ For over a decade, the percentage of manufacturing jobs in relation to the overall workforce in the Metropolitan Region has declined. Service sector job creation has increased rapidly while manufacturing job growth has continued at a modest pace until 2000, and since has demonstrated a modest

³⁴ Digital Economy 2000, US Department of Commerce, Economics and Statistics Administration, Washington DC, June 2000.

³⁵ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.



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decline. Electronics manufacturing is the Metropolitan Region's best source toward rejuvenating its manufacturing industry.

The industries³⁶ within the electronics manufacturing cluster include:

- Computers and equipment
- Calculating and office machines
- Magnetic and optical recording media
- Electron tubes
- Printed circuit boards
- Semiconductors
- Passive electronic components
- Industrial instruments for measurement
- Instruments for measuring electricity
- Laboratory analytical instruments
- Communications equipment industries
 - Household and video equipment
 - Telephone and telegraph equipment
 - Radio and television communications equipment

Within this industry classification, core information technology industries are the fastest-growing in the U.S. economy³⁷, including electronic components and accessories, computer and office equipment and computer and data processing services. Nebraska's strengths do not fall in the categories of electron tubes, printed circuit boards, or semiconductors. Nebraska's targets are in the electronic measuring devices, instrumentation, and electronic telecommunication equipment areas.

³⁶ Digital Economy 2000, US Department of Commerce, Economics and Statistics Administration, Washington DC, June 2000.

³⁷ Milken Institute, Md30 Summary, Santa Monica CA, 2000.



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Mature high-tech manufacturers place a higher value on traditional cost of doing business measures than high-tech service companies.³⁸ Electronics, computers, and instrument manufacturing are most interested in facilities with adequate square footage and truck access at a reasonable costs.³⁹ Included in the decision-making is a desire for an attractive and productive work environment for employees as well as a prestigious location that will impress the clients.

Film Industry

Why target the development of a film industry in Nebraska? Some outside of California might question motion picture production and services inclusion as a high-tech industry. Motion pictures production and services are playing a key role in the development of multi-media and entertainment technologies. These technologies combine film, television, and amusements with animations and digital-audio sound effects. These are all cutting-edge applications of technology.⁴⁰ Over the past 20 years, these industries have more than doubled their share of the U.S. economy and today account for somewhere between 11 and 12 percent of the total economy.⁴¹

Media conglomerates are racing to develop a new wave of web-based entertainment delivering music, video, and interactive content around the globe with new broadband technologies.⁴² This is an area with huge growth potential, including entertainment-based technology, multimedia, software, and a broad range of Internet applications.

Nebraska cannot overlook the entertainment industry as a technology industry. Although a fledgling industry in the state, it is already starting to develop. Prophet Systems Innovations, Inc. in Ogallala is one of those leading

³⁸ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.

³⁹ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.

⁴⁰ DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.

⁴¹ DeVol, Ross C., Blueprint For A High-Tech Cluster, The Case Of The Microsystems Industry In The Southwest, Milken Institute, Santa Monica CA, August 8, 2000.

⁴² DeVol, Ross C., Technology Clusters: A New Paradigm For Southern California's Economy, Milken Institute, Santa Monica CA, October, 1999.



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edge companies in entertainment network development. The Peter Kiewit Institute for Information Science Technology and Engineering in Omaha is also entering the field, developing programs and curriculum in the high-tech entertainment environment. Balantyne manufactures movie projectors and lighting systems in Omaha, which is also home to Chip Davis' American Gramophone recording studio. In addition, the University of Nebraska has film study programs at both the Lincoln and Omaha campuses. From an economic development perspective, the film industry as a high-tech, information technology industry has been mostly ignored. It has the potential to become one of the fastest growing technology industries in the world and should be included as a target for suburban technology parks.

If Nebraska is to develop a film industry, basic infrastructure to support this industry must be constructed in the Metropolitan Region. The development of the basic infrastructure in the Metropolitan Region will allow film production to be staged throughout Nebraska. This basic infrastructure includes a world-class sound stage. The Department of economic Development has a study underway to identify the infrastructure necessary to develop the film industry in Nebraska.

Industrial/Business Park Site Standards: Overall Site Standards for Technology Parks in Suburban Settings

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When a company is making its initial location evaluation of candidate communities, several key standards are evaluated, including available sites. Site priority will vary. For some companies the site will be the top priority due to specific requirements (e.g., special use, size, highways, gas lines, power, etc.). For other companies, real estate comes after the choice of the region, labor requirements, customer access, etc. For each specific location decision, overall prospect requirements will be much more extensive; and other specific criteria may determine the final location decision. The following list of site standards is not all inclusive, but includes factors for the large majority of location searches that will determine whether a site makes the first cut:

- **Available acreage** Sufficient acreage, either on one parcel or through assembling multiple parcels, to ensure that current and future expansion needs are satisfied. Preference is for parcels held by one owner

⁴³ Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.



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or not requiring assembly because timing may be adversely affected: Estimated size of park is 240 to 3,000 acres (some larger manufacturing operations may need upwards of 100+ acres, however, these operations often select individual, stand alone sites).

- **Configuration (square / rectangular preferred)** Square or rectangular sites offer the greatest flexibility and satisfy most uses.
- **Zoning** In-place zoning increases speed-to-market, decreases implementation costs, and minimizes risk, notably that rezoning a site will be unsuccessful or will compromise the project timeframe: Zoning categories need to accommodate light industrial, medium industrial, back office and commercial. Zoning helps users anticipate other industries that might be a neighbor.
- **Type (e.g., industrial, office, business, technology, high-end)** Locating in a business park or area in which the uses are consistent with a project's intended use may increase the likelihood of reliable infrastructure (e.g., utilities, emergency response, etc.), increase the likelihood of appropriate zoning, and reduce the risks outlined below in "surrounding uses."**Infrastructure (e.g., utilities, accessibility, rail, etc.)** In-place infrastructure increases speed-to-market, decreases construction and implementation costs, and minimizes risk (e.g., a proposed access road or interchange may not be constructed when planned).
- **Prior use (e.g., greenfield vs. brownfield; agricultural vs. mfg.)** Sites not previously used for industrial applications (e.g, greenfield, agricultural, etc.) minimize potential environmental risk and financial liability, as well as potentially decrease construction costs (e.g., site preparation, environmental remediation, etc.). Timing can also be adversely affected by brownfield sites.
- **General physical condition (e.g., treed, graded, topography, flood plain etc.)** Fewer construction challenges to overcome (e.g., topography, tree clearing, etc.) increase speed-to-market and decrease construction costs; soil bearing—there should be no subsidence issues (e.g., mines, limestone, or caves). Topography should ideally be level to slightly rolling. A flood plain can be a fatal flaw.**Regulatory restrictions (e.g., EPA, wetlands, etc.)** Fewer restrictions allow management greater flexibility in preparing the site, constructing the facility, and managing the business. Typically look for an attainment area (for criteria air pollutants) not in the glide path of an airport, with no wetlands on site.
- **Surrounding uses (e.g., residential, retail, commercial, primary or secondary schools, etc.)** Avoidance of surrounding uses other than similar types of businesses reduces likelihood of negative perceptions by local



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residents and minimizes potential risks during an uncontrollable accident (e.g., fire). Most site seekers will avoid odors, particulates, and other pollutants in the air.

- **Image and Visual Appeal** Compatible with company image and marketplace reputation (visibility, frontage, etc.). **Compatibility Issues** No other negatives; negatives might include incompatible activities, close proximity to Superfund or landfill site, public access, etc.; pluses might include an outstanding view, location on the water, etc..

Suburban Tech Park Profile

Well-designed suburban technology parks can accommodate a mix of information, manufacturing, and professional service firms. Suburban tech parks have a horizontal orientation. They are characterized by one, two, and three story buildings set in an open, airy environment. This environment includes:

- master planned park
- boulevard streets, cul-de-sacs, no on-street parking
- secure entrances and park design, including on-park private security services
- groomed lawns, trees, landscaping
- area devoted to natural open space, wetlands, and recreational use by employees.
- automobile friendliness with easy access to off-street parking
- lower density office and manufacturing lots with a variety of lot sizes
- excellent interstate/highway access
- strict covenants pertaining to building design, construction materials, green space requirements, and, typically, a ban on outside storage.
- Advanced infrastructure
 - State-of-the-art, uninterruptible telecommunication infrastructure (voice, data, broadband, Internet)
 - On-site digital switching center
 - Redundant, uninterruptible electric power
 - Municipal water, wastewater, and solid waste services
 - Underground utilities



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- Planned amenities: day care, elder care, physical fitness facility, food services, designated commercial areas, and outdoor recreational facilities.
- Many of the technology parks contain a resource center or conference center. The resource center functions as the support services center for the park's resident businesses.
 - Hotel rooms
 - Restaurant, banquet, and food service capabilities
 - Meeting rooms
 - Training rooms and facilities
 - Video conference facilities
 - Computer training labs
 - On-site architectural, engineering, and property management services
 - Transitional office space – offices for temporary use during start-up phase
 - Services
 - Information systems integration
 - Executive staffing, employment service
 - Jobs skills bank (pool of potential employees)
 - University & community college offices
 - Security services
 - Economic development office

Every detail of the park should be carefully planned to help the businesses shorten their start-up time-table, operate efficiently, and maximize profitability. The sites should range from small (under one acre) to large multi-acre configurations. Leasing arrangements and build-to-suit assistance should be available.

The technology support infrastructure is vital. Telecom and power service needs to provide fail-safe diversity with multiple lines and micro switching to ensure continuous transmission to every building site. If possible, a switching center on-site featuring optical distribution (ACD) and integrated services digital network (ISDN) plus



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a remote central office will provide maximum telecommunication services while ensuring the lowest tariffs on outgoing and incoming telecommunications transmission.⁴⁴

Based on the types of businesses attracted to technology parks, security has always been an issue. Following September 11th, it is an even bigger consideration. Emergency services through municipal police, fire and rescue services should be part of the park's design. Security services in the form of on-site uniformed personnel and marked vehicles should also be a consideration. This may mean limiting the points of access to the park to two or three, lending credence to a main boulevard design complemented by cul-de-sacs or only internally connecting roads.

Although specific targeted industries have been discussed in this paper, the general targets include light manufacturing, production of high tech products, and electronics assembly, pharmaceutical production, software development, companies involved with the distribution of intensive data files including video companies, photographic archives, engineering, software operations, and companies that move large volumes of information such as data processing, credit card companies, payroll centers, catalog sales companies, reservation centers, and telemarketers.

Certain targets have specific infrastructure requirements. Wet and dry biotechnology laboratories are very expensive to construct. These facilities require containment and disposal capabilities for radioactive and biological substances. Very high standards are required for ventilation, security, floor loads, and the quality and abundance of electric power and water.⁴⁵

Software firms require redundancy in power sources and access to telecommunication lines, back-up power, and space to expand their operations. There is more to software firms than just software development. More mature firms have large floor plates accommodating many other functions from marketing to finance.⁴⁶

⁴⁴ Paducah Information Age Park, Greater Paducah Economic Development Council, Paducah KY, July 2000.

⁴⁵ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.

⁴⁶ Sommers, Paul and Daniel Carlson, Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle, Center On Urban And Metropolitan Policy, The Brookings Institute, University of Washington, Seattle, WA, December 2000.



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Internet related firms combine high-tech infrastructure and creative content requirements. Specifically, they need ready access to high bandwidth telecommunication systems.

Technology Park Location Decision

Communities should consider the following factors when choosing a location for a technology park:

- Proximity to major highways, interstate,
- Proximity to air service
 - overnight air freight services,
 - passenger and commercial air services,
 - general aviation services (corporate aircraft)
- Overnight delivery
- Proximity and convenient passenger car travel to major research institutions
- Immediate access to the community:⁴⁷
 - Airport
 - Country club
 - Housing (proximity to appropriate housing for management and employees)
 - Community college (special training and continuing education opportunities, customized training)
 - University
 - Hospital, emergency care, medical care
 - Retail
 - Recreational and cultural activities

⁴⁷ Paducah Information Age Park, Greater Paducah Economic Development Council, Paducah KY, July 2000.



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Industry Clusters

Conclusions

- Real estate product, available in a timely manner, with appropriate characteristics and infrastructure, is a critical priority necessary for communities to compete in the site location sweepstakes.
- Communities within the Metropolitan Region should go through a decision-making process to determine which industries they will try to develop and what configuration of technology park they must develop to strategically place themselves for the development of targeted technology industries.
- Of the three types of suburban technology parks, the one most suitable for development in Nebraska's Metropolitan Region is the high-tech office and manufacturing park.
- The Metropolitan Region has the basic infrastructure, technology support services, technology workforce, and existing technology cluster density to support one or more significant suburban technology park developments.
- The Lincoln-Omaha Interstate 80 Corridor is well positioned to support one or more technology parks, supporting short commuting distances to Nebraska's major research institutions located in downtown Omaha and Lincoln.
- Nebraska needs to continue to develop its:
 - research capabilities, including promoting research transitions from pure research to applied research to commercialization,
 - venture capital resources
 - incubation support
- In most cases, communities will not be able to put the necessary assets in place without assistance.
- NDED, working with local economic development organizations, developers, financing sources, and foundations should investigate the viability of developing one or more regional technology parks designed specifically for companies in the targeted high-tech industries.



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After making a short list of candidate sites, site seekers look for a community to provide additional information. Although specific requirements will differ by prospect, general categories and selected data points include:⁴⁸ General

- Brokerage listing with clear presentation of appropriate contact(s)
- Sale price (for buildings; lease rate and operating expenses may be applicable)

Business Climate

- Available / applicable incentives
- Responsive economic development team

Expansion / Growth Potential

- Adequate parking with room for expansion
- Expansion potential
- New companies or expansion by existing companies in the area
- New or projected construction in the area

History

- Current and former use
- Environmental audit (Independent phase I)
- Low natural disasters risk (e.g., earthquakes)
- No abandoned mines underneath property
- No archeological significance, cemeteries, or burial grounds
- No below ground gasoline, fuel oil, or other chemical storage tanks or pipelines
- No endangered species or wildlife preserves
- No evidence of excessive or problematic soil conditions (e.g., erosion)
- No hazardous materials, contaminated soil, or asbestos
- No state/national parks or forests
- Lack of proximity to operations with environmental issues
- Ownership status / history
- Property inspection reports

⁴⁸ Deloitte & Touche Fantus, Industrial/Business Park Standards, New York, NY, July, 2001.



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- Surrounding land uses and ownership status

Labor Climate

- Aesthetically attractive property
- Favorable labor-management relations environment
- Location vis-à-vis labor shed (i.e., skilled, educated workforce)
- Major employers in the area

Physical Characteristics

- Adjacent property descriptions
- Configuration (typically rectangular or square preferred)
- Dust/particulate/odor free area
- Construction / preparation time (availability of labor)
- Geology / soils report (soil bearing capacity) – seek minimal foundation engineering
- Natural or man-made water bodies
- No rock outcroppings or significant development constraints
- No wetlands or floodplains
- On-site vegetation
- Photographs (aerial and site)
- Site elevation
- Site plan and land survey
- Size of property (acreage) or building (square footage)
- Specifications
- Topographic maps; plats; drawings
- Watershed or wetland survey
- Workable topography

Quality of Life

- Ample distance from residential areas and schools
- Crime safe area or appropriate security for the location (gate, guard, fence)
- On-site or nearby child care
- Proximity to business amenities (hotels, restaurants, overnight carriers, staffing agencies)



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Regulations (Assessment / Permitting / Taxation / Zoning)

- Allowable coverage ratio and minimum setbacks
- Appropriate zoning
- Assessor's parcel number
- Covenants, design guidelines, and restrictions affecting development
- Easements (widths, locations, rights-of-way)
- Green or open space requirements
- Municipal jurisdictions (within or outside city limits)
- Reasonable building permit process and expected timeframe
- Reasonable permitting approval process
- Solid waste disposal
- Special regulatory zones (e.g., air quality, wildlife preserve, endangered species, etc.)
- Subdivision regulations
- Zoning description and map (zoning variance process and timeframe if necessary)

Transportation

- Map of highway / transportation network
- Outside of the flight path of a commercial airport or military airfield
- Proximity to mass transit nodes (bus lines, train stops, or interstate exits)
- Readily accessible for cars and trucks (appropriate turn lanes, traffic signals, etc.)
- Readily available and proximate fire protection and emergency services
- Reasonable existing vehicular traffic flow
- Within immediate proximity of an interstate highway network

Utilities

- Appropriate location for intended use (fits into the context of immediate area)
- Digital switching and fiber optic availability
- Dual feed power service
- Existing utilities – Location, size, consistent with infrastructure (if infrastructure not in-place, then cost and distance to extend existing lines)
- Municipal electric, natural gas, water, and sewer



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- Rates
- Reliability of electric and gas service



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