HIGH-TECH TRANSPORTATION CORRIDORS ARE IN VOGUE: PROPOSED FEDERAL TRANSPORTATION POLICY AMENDMENTS

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I. Introduction to High-Tech Transportation Corridors (HTTCs)

When there is an economic downturn, cities are forced to develop a strategy to revitalize. Increasing the transfer of high technology into the marketplace stimulates the economy.[1] High-tech industries are industries that include relatively high percentages of scientific and technical workers, or industries that make relatively large expenditures in research and development.[2] "[I]n difficult economic times, political stakeholders in the technology transfer process usually view success in economic impact terms, and often from short-term and parochial perspectives—how many jobs in my state next year?"[3] Examples include the expansion of the suburban space economy in the 1980s that produced new commercial landscapes in Maryland, Virginia, and Washington D.C. in the form of high-tech corridors along limited-access highways.[4] These corridors were designed using private mixed-use development master plans.[5]

Although not focused on high-tech per se, another interesting early use of this HTTC concept is Georgia's Governor's Road Improvement Program (GRIP), initiated in 1989 by a resolution of the state legislature and the Governor.[6] The program's goal is to

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[1] Michael Peltz & Marc A. Weiss, *State and Local Government Roles in Industrial Innovation*, J. Am. Plan. Ass'n 270, 270 (1984). Governments create programs to stimulate technological innovation and growth of high-technology industries by either adopting strategies to attract relocating or expanding businesses; or by encouraging local innovation and startup business development. These strategies are often a response to competition by other states. *Id.*

[2] Michael I. Luger, *Does North Carolina's High-Tech Development Program Work?*, J. Am. Plan. Ass'n 280 (1984).

[3] Robert Carr, *A Proposal for a Framework for Measuring and Evaluating Technology Transfer From the Federal Laboratories to Industry*, *in* From Lab to Market: Commercialization of Public Sector Technology 299, 302 (Suleiman K. Kassicieh & H. Raymond Radosevich eds., 1994).

[4] *See* Paul L. Knox, *The Restless Urban Landscape: Economic and Sociocultural Change and the Transformation of Metropolitan Washington, DC*, 81(2) Annals Ass'n Am. Geographers 181, 202–03 (1991) (explaining that the high-tech corridors are taking a form "very different from the infilling, multinucleation, commercial strips, bypass strips and mixed-use suburban freeway corridors of the modern metropolis").

[5] *See id.* at 202 (noting that these plans combine large scale structures such as office blocks, R&D labs, clean industries and hotels with generous landscaping, extensive parking and variety of services and amenities).

[6] Douglas C. Bachtel et al., Georgia Dep't of Transp., An Analysis of The Governor's Road Improvement Program (GRIP) For the Georgia Department of Transportation, http://www.dot.state.ga.us/DOT/plan-prog/planning/programs/grip/grip_documents/grip.doc (last visited Mar. 20, 2004); *see*

connect 95% of the state's cities (with a population of 2,500 or more) to the Interstate System and to ensure that 98% of all areas within the state will be within twenty miles of a four-lane road.[7] The GRIP initiative involves converting sixteen routes into multi-lane highways to stimulate economic development in rural areas.[8] Economic indicators such as retail sales, total net digest, per capita income, transfer payments, total unemployment, unemployment by race and sex, and total buying power were analyzed.[9] The GRIP analysis indicated that this system helped businesses decrease their shipping costs and expand their access to markets; and helped workers increase their employment opportunities as travel times and costs were reduced.[10]

Today, creating HTTCs is becoming a very popular strategy for economic development proponents as a revitalization technique. HTTCs are typically defined as segments along U.S. interstate or state transportation routes; however, they can be located on city streets. Since transportation is the backbone of a city, town, or region, the idea is to create a cluster of high-tech companies along the transportation route. Clusters are critical masses of unusual competitive success.[11] They are comprised of linked industries and interconnected companies, such as government institutions.[12] Clusters "extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs."[13]

These business clusters are promoted and publicized using the name of the route and the term "corridor" (e.g., the I-79 High-Tech Corridor). Therefore, although HTTCs may naturally form, they are often aggressively created and promoted by business and economic development leaders.[14] HTTCs are created or naturally formed in regions where high technology is important, such as the

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also GEORGIA DEP'T OF TRANSP., PLANNING PROGRAMS, GOVERNOR'S ROAD IMPROVEMENT PROGRAM, http://www.dot.state.ga.us/DOT/plan-prog/planning/programs/grip/index.shtml (last visited Mar. 20, 2004).

[7] GEORGIA DEP'T OF TRANSP., *supra* note 6.

[8] *See* BACHTEL ET AL., *supra* note 6.

[9] *Id.*

[10] *Id.*

[11] Michael Porter, *Clusters and the New Economics of Competition*, HARV. BUS. REV., Nov.–Dec. 1998, at 77, 78.

[12] *Id.* at 78–79.

[13] *Id.* at 78.

[14] *See id.* at 84; *see also* Edward J. Malecki, *High Technology and Local Economic Development*, J. AM. PLAN. ASS'N 262, 262 (1984).

early models in Silicon Valley, Route 128 surrounding Boston, and the Research Triangle (Raleigh-Durham-Chapel Hill) in North Carolina.[15] However, in 1984, Malecki predicted that "[t]he conditions that generated those prominent examples . . . are unlikely to be replicated in many other locations."[16]

For nearly two decades, economists, geographers, and economic development planners have sought alternative models of development in which existing activities are sustained or transformed in ways that maintain relatively high wage levels, social wages, and quality of life.[17] Today, the sustainability and repeatability of these corridors are still a concern. In particular, there have been very liberal interpretations of high technology in economic development promotion in order to make areas more attractive to high-tech industries.[18] No ideal model for developing high-tech corridors has been adopted by practitioners.

In the table below, a listing of popular HTTCs has been compiled. Most of them were discovered in trade and news sources.

State	High-Tech Transportation Corridor
AL	I-65 from Birmingham to Huntsville (having Cummings Research Park)[19]
AL	I-85 Montgomery to Georgia state line[20]
AZ	Phoenix Silicon Alley (a 20 block stretch of Central Avenue)[21]

[15] *See* Malecki, *supra* note 14, at 262.

[16] *Id.*

[17] *Id.* at 265.

[18] *See id.* at 262 (discussing the use of liberal interpretations of high-tech corridors by economic development promoters).

[19] *See* Ron Starner & Ginny Deal, *Hot High-Tech Markets to Watch*, SITE SELECTION, July 2001 (noting that, according to the Software & Information Industry Association, Huntsville ranked fifth in software development), http://www.siteselection.com/issues/2001/jul/p446/ (last visited Mar. 20, 2004); *see also* Sarah Pavlik, *Southeastern Silicon Valley: Could a High-Tech Corridor Emerge Between Birmingham, Huntsville?*, BIRMINGHAM BUS. J., July 16, 2001, http://birmingham.bizjournals.com/birmingham/stories/2001/07/16/focus1.html (last visited Mar. 20, 2004).

[20] *Consultants Begin AU Research Park Study*, AU RESEARCH NEWS, Feb. 2003, http://www.auburn.edu/research/vpr/communications/resnews/feb03.html (last visited Mar. 20, 2004).

[21] *See* Alan Enrenhalt, *Silicon This, Silicon That*, GOVERNING MAG., Apr. 3, 1998, (describing Phoenix's Silicon Alley as including Microsoft, IBM, AT&T as well as more than twenty other technology companies), http://www.informationcity.org/telecom-cities/archive/old/0608.html (last visited Mar. 20, 2004).

State	High-Tech Transportation Corridor
CA	I-80 Davis[22]
CA	Silicon Valley, I-880, I-280, US 101, Hwys 237 and 85[23] (known as "Silicon Valley," rather than by reference to transportation routes)
DC	I-95 Fairfax County/Prince Williams Co.[24]
DE	Hwy 141 Delaware[25]
FL	I-4 (Central Florida)[26]
FL	I-10 Tallahassee to Pensacola[27]
GA	GRIP System (the creation of 16 multi-lane highway corridors in the state of Georgia to influence economic development in rural areas)[28]
GA	Ga 400 from Buckhead to I-285 (Roswell/Alpharetta)[29]
ID	I-90 Idaho[30]
IL	I-88 Chicago Oakbrook west suburb[31]

[22] Celia Lamb, *UCD Record: $298M for Researchers*, SACRAMENTO BUS. J., Nov. 12, 2001, http://sacramento.bizjournals.com/sacramento/stories/2001/11/12/story6.html (last visited Mar. 20, 2004).

[23] *See* ANNALEE SAXENIAN, REGIONAL ADVANTAGE, CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 128 30 (1994) (describing the north, south, east, and west boundaries of Silicon Valley); *see also* AREA & REGIONAL SETTING, BART EXTENSION, http://www.svrtc-vta.org/vta/area.asp (last visited Mar. 20, 2004).

[24] Knox, *supra* note 4, at 202.

[25] SHERI L. WOODRUFF & JENNIFER POWELL, OFFICE OF THE GOVERNOR, STATE OF DELAWARE, CARPER UNVEILS PLANS—AND $10 MILLION REQUEST—FOR DELAWARE BIOTECHNOLOGY INSTITUTE (1999), *at* http://www.state.de.us/dedo/news/1999/biotech.htm (last visited Mar. 20, 2004).

[26] PARTNERING TO SHAPE FLORIDA'S ECONOMIC FUTURE, STATEWIDE STRATEGIC PLAN FOR ECONOMIC DEVELOPMENT 2002–2007 (2001), *at* http://www.eflorida.com/strategicplan/2002/PartneringStrategy02-07.pdf (last visited Mar. 20, 2004); *see also* PROGRESS ENERGY, BIOTECH & BIOMEDICAL COMPANIES TAKE ROOT IN THE CAROLINAS AND FLORIDA, SECOND QUARTER 01, at 2, http://www.progress-energy.com/community/relocating/nc/newsletters/EDCircuit2q01.pdf (last visited Mar. 20, 2004) [hereinafter BIOTECH & BIOMEDICAL COMPANIES].

[27] CHRISTINE JORDAN SEXTON, NORTHWEST A WINNING COMBINATION, BUS. FLORIDA (2003), *at* http://www.businessflorida.com/regions/reg-nw.asp (last visited Mar. 20, 2004).

[28] BACHTEL ET AL., *supra* note 6.

[29] Judith Potwora, *Ga. 400 High-Tech Corridor Continues Its Growth*, ATLANTA BUS. CHRON., Apr. 16, 2001, *at* http://atlanta.bizjournals.com/atlanta/stories/2001/04/16/focus3.html (last visited Mar. 20, 2004); *see also* Michael Lewyn, *How City Hall Caused Sprawl: A Case Study*, 30 ECOLOGY L.Q. 189, 195–96 (2003) (reviewing LARRY KEATING, ATLANTA: RACE, CLASS AND URBAN EXPANSION (2001) and noting that Atlanta supported sprawl inducing highways such as GA 400).

[30] *See* CTR. FOR SCI. & TECH. UNIV. PLACE, UNIV. OF IDAHO (2001) (discussing the creation of a high-tech corridor in Idaho), *at* http://www.if.uidaho.edu/cst (last visited Mar. 20, 2004).

[31] David Nicklaus, *Area's Technology Corridor is Growing Along Highway 40*, ST. LOUIS POST-DISPATCH, May 22, 2000 (noting the success of Interstate 88 and

State	High-Tech Transportation Corridor
KY	US 27, I-275, AA Hwy[32]
MA	I-495, Massachusetts[33]
MA	Rte 128 (MIT & Harvard in Boston, 1954 Waltham Industrial Park)[34]
MD	I-270 Bethesda to Gaithersburg (DNA Alley)[35]
MI	I-94 Ann Arbor – Detroit High-Tech Corridor[36]
MN	I-94, Hwy 280 NTHT,[37] a science corridor between the U. of Minn., Minneapolis and the Univ. of Minn., St Paul campuses
MO	U.S. Hwy 40/61 St Charles County, Missouri,[38] U.S. Hwy 40/I-64 west of downtown St. Louis and east of the Missouri River to Hwy 141 in Chesterfield[39]

the potential for Highway 40), *at* http://www.umtechparks.com/newspage.php?NewsID=8 (last visited Mar. 20, 2004).

[32] N. KY. CHAMBER OF COMMERCE, NEW ECONOMY PLAN FOR N. KY. (2001), *at* http://www.madisone-zone.com/NKYTechnologyInitiative.PDF (last visited Mar. 20, 2004).

[33] *See* Kathryn B. Hill, *Harvard U. Study Finds Continued Segregation,* HARV. CRIMSON, *reprinted in* HOYA, Apr. 10, 2001, (indicating that the creation of high-tech corridors have contributed to maintained segregation), http://www.thehoya.com/news/041001/news10.htm (last visited Mar. 20, 2004).

[34] *See* Carey Goldberg, *Across the U.S., Universities Are Fueling High-Tech Economic Boom*, N.Y. TIMES, Oct. 8, 1999, at A12; *see also* Hill, *supra* note 33.

[35] Starner & Deal, *supra* note 19; *see also* Knox, *supra* note 4, at 202 (noting that the I-270 Technology Corridor is more than 130 firms "anchored by the National Institutes of Health, the Bureau of Standards, the U.S. Agricultural Center, the Food and Drug Administration, and the U.S. Patent and Trademark Office).

[36] WASHTENAW DEVELOPMENT COUNCIL, THE WASHTENAW ADVANTAGE: WE HAVE WHAT MATTERS TO YOU (2004) (stating that "Willow Run enjoys a prime location along the Ann Arbor-Detroit high-tech corridor), *at* http://www.wdc-econdev.com/advantage.pdf (last visited Mar. 20, 2004).

[37] Steve Alexander, *City (Minneapolis) and University (UM) Officials are Working on Plans for a High-Tech Incubator,* MINNEAPOLIS STAR TRIBUNE, Aug. 22, 2000, http://www.nasvf.org/web/allpress.nsf/pages/884 (last visited Mar. 20, 2004); *see also* Sara Aase, *The Next Big Thing*, MINN. TECH. (2003), http://www.minnesotatechnology.org (last visited Mar. 20, 2004).

[38] Cathy Thomas, *High-Tech Corridor is Goal Business and Municipal Leaders Seek to Replace Junk Stores and Taverns*, ST. LOUIS POST-DISPATCH, Dec. 24, 1992, http://nl.newsbank.com/nl-search/we/Archives?p_product=sl&p_theme=sl&p_action=search&p_maxdocs=200&s_dispstring=high-tech%20corridor&p_field_date-0=YMD_date&p_params_date-0=date:B,E&p_text_date-0=1992&p_field_advanced-0=&p_text_advanced-0=("high-tech%20corridor")&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no (last visited Mar. 20, 2004); *see also* Nicklaus, *supra* note 31; *see also* April Kruse, *St. Charles Grows a High-tech Corridor*, ST. LOUIS BUS. J., Jul. 23, 1999, http://www.um-mrp.org/newspage.php?NewsID=14 (last visited Mar. 20, 2004).

[39] *See* Chet Snyder, *Market Conditions for Chesterfield, Missouri*, REALTY TIMES, Sept. 2, 2003 (illustrating the marketability of areas connected to high-

State	High-Tech Transportation Corridor
MO	I-370 St. Louis County, Missouri in St. Charles[40]
MT	I-90 and I-15 Silicon Mountain in Butte, Montana[41]
NC	I-95, I-40, US 70 (the Raleigh-Durham Hwy) known as the Research Triangle[42]
ND	I-94[43] between Fargo-Moorhead and the Twin Cities
NJ	Rte 1 in North Brunswick Princeton Corridor[44]
NM	I-25, Albuquerque (from Los Alamos northwest of Santa Fe to New Mexico State University just north of the Mexican border; includes the Sandia Science and Technology Park)[45]
NY	Silicon Alley in Lower Manhattan below 59th Street to the south tip of Manhattan Island[46]
OH	Cincinnati's Digital Rhine, Over the Rhine, 12th and Main Streets[47]
OR	Sunset Hwy 26, Portland's Sunset Corridor (a.k.a., the Silicon Forest)[48]

tech corridors), *at* http://realtytimes.com/rtmcrcond/missouri~chesterfield~chetsnyder (last visited Mar. 20, 2004).

[40] *See* Betty Magrath, *Highway 370 Becomes Missouri's High-Tech Corridor*, ST. LOUIS FRONT PAGE, Nov. 16, 1999 (launching a public-private partnership to create a high-tech corridor along twelve miles of interstate highway), http://www.slfp.com/STC-News1117.htm (last visited Mar. 20, 2004).

[41] Kathleen McMahon, *Smart and Smarter*, PLAN., Jul. 1999, at 10, 10–13.

[42] *See* Luger, *supra* note 2 at 285 (discussing the research triangle); *see also* BIOTECH & BIOMEDICAL COMPANIES, *supra* note 26, at 5.

[43] Patrick Springer, *Fantastic Voyage: NDSU's Entry into Tiny 'Nano-World' is a Big Step for Technology Transfer*, NDSU MAG., Fall 2001, http://www.ndsu.nodak.edu/ndsu/news/magazine/vol02_issue01/mag.102001.pdf (last visited Mar. 20, 2004).

[44] Mali R. Schantz-Feld, *The Garden State, Which Responded Admirably to it's Neighbor's Needs After September 11, Continues to Grow Its Technology, Pharmaceutical, Agricultural, and Other Industries*, LOCATION USA ONLINE, *at* http://www.locationusa.com/profiles/nj.html (last visited Mar. 20, 2004).

[45] *See* James H. Andrews, *Tale of Three Cities*, PLAN., Jul. 2001, at 18, 20 (promoting the high-tech corridor as "an unrivaled fiber-optic information infrastructure).

[46] *See* Gary Abramson, *Cluster Power*, CIO ENTERPRISE MAG., Aug. 15, 1998 (stating that Silicon Alley includes Ericsson, Sun Microsystems, Nokia, and the Data General Corporation), http://www.cio.com/archive/enterprise/081598_cluster.html (last visited Mar. 20, 2004). In addition, Columbia University, Cornell University, and Polytechnic University in Brooklyn opened branches in Silicon Alley. *Id.*

[47] *See* Louis Jacobson, *Internet Business Boosts Cincinnati's Over-the-Rhine*, PLAN., Jul. 2001, at 29, 29; Janet R. Daly Bednarek, *Changing Plans for America's Inner Cities: Cincinnati's Over-the-Rhine and Twentieth-Century Urbanism*, 65 J. ANN. PLAN. ASS'N 125, 125–126 (1999) (reviewing a book of the same title by Zane L. Miller & Bruce Tucker).

[48] *See* Robert T. Dunphy, *The Cost of Being Close: Land Values and Housing Prices in Portland's High-Tech Corridor*, ULI WORKING PAPER SERIES NO. 660 (Oct. 1998) (suggesting that the placement of the Sunset Corridor in Washington

State	High-Tech Transportation Corridor
PA	I-99 between I-76 and I-80 (Phillie to New York City)[49]
PA	Rte 202 in Chester County in West Chester, Malvern, Berwyn[50]
SC	I-77 and I-26, University of South Carolina's research park[51]
SD	I-29 from Kansas City to Winnipeg[52]
TN	The Pellissippi Parkway, north of I-40/75, Tennessee Technology Corridor Development Authority and a 7,000 acre Technology Overlay Zone stretching through west Knox County[53] (Oakridge to Knoxville)
TX	I-35[54]
TX	North Central Expressway, LBJ Freeway, George Bush Freeway – T-shaped Austin Telecom corridor[55]

county will lead the region in growth), http://research.uli.org/Content/Reports/Reports_WP660.htm (last visited Mar. 20, 2004).

[49] Jeff Meredith, *Growth of a High-Tech Corridor: Do or Die*, I-STREET, June 2002, http://www.i-street.com/magazinearchive/yr2002/mn06/hightech.asp (last visited Mar. 20, 2004); *see also* Graham Spanier, Address at the ABCD Corporation, Building a Technology and Innovation Corridor (April 25, 2002), http://www.psu.edu/ur/GSpanier/speeches/innovationcorridor_042502.html (last visited Mar. 20, 2004).

[50] ECON. BUS. & DEV., CHESTER COUNTY (2002), http://216.146.231.61/Chestercounty.htm (last visited Mar. 20, 2004).

[51] RESEARCH PARKS GROUP, CAROLINA RESEARCH PARK, *at* http://rpg.scra.org/carolina.html (last visited Mar. 20, 2004); *see also* BIOTECH & BIOMEDICAL COMPANIES, *supra* note 26.

[52] Lance Nixon, *Building a High-Tech Highway*, SIOUX FALLS ARGUS LEADER, Aug. 25, 2000, *at* http://www.nasvf.org/web/allpress.nsf/pages/94 (last visited Mar. 20, 2004).

[53] TENN. TECH. CORRIDOR DEV. AUTHORITY: TENN. TECH. CORRIDOR DEV. AUTHORITY, WHAT IS IT? (2004), *at* http://www.knoxmpc.org/ttcda/ (last visited Mar. 20, 2004); *see also* Malecki, *supra* note 14, at 262.

[54] *See* Renee Haines, *I-35: An Interstate Becomes a Global Corridor*, SITE SELECTION, Feb./Mar. 1998 (stating that I-35 is a federal High Priority Corridor, a proposed International Trade Corridor), *at* http://www.conway.com/i35/9802/index.htm (last visited Mar. 20, 2004); *see also* Claudia Allen, *Finding Technical Talent When Demand Outpaces Supply*, 57(4) J. CAREER PLAN. & EMP. 21, 21, 23 (1997) (noting that Austin's Chamber of Commerce sent recruiters to Boston's Route 128 Corridor Job Fair to raid highly skilled graduates); THE AUSTIN—SAN ANTONIO CORRIDOR COUNCIL, THE GREATER AUSTIN—SAN ANTONIO CORRIDOR COUNCIL LAUNCHES REGIONS' FIRST NANOBIOTECHNOLOGY SUMMIT: NANOBIOTGECH SUMMIT TO SERVE AS CATALYST FOR ECONOMIC DEVELOPMENT IN THE CORRIDOR (2003), http://www.winstead.com/pressroom/pressrelease/pressrelesefull_p.asp?id=630 (last visited Mar. 20, 2004) [hereinafter THE AUSTIN—SAN ANTONIO CORRIDOR COUNCIL).

[55] THE AUSTIN—SAN ANTONIO CORRIDOR COUNCIL, *supra* note 54; *see also* Mary Alice Kaspar, *Corridor Collaboration*, AUSTIN BUS. J., Aug. 12, 2002, http://austin.bizjournals.com/austin/stones/2002/08/12/story2.html?t=printable (last visited Mar. 20, 2004); *see also* TELECOM CORRIDOR, FAQ (2004) http://www.telecomcorridor.com/tc/faq.html (last visited Mar. 20, 2004); *see also* Josh Farley

State	High-Tech Transportation Corridor
VA	Hwys 7/267, The Dulles Corridor in Northern Virginia, Loudoun county between Tyson's Corner and Sterling[56]
WV	I-79 from Bridgeport to Morgantown near Pennsylvania[57]

The concept of creating a high-tech corridor is a subset of the Regional Systems of Innovation (RSI).[58] "RSI results from a territorially embedded institutional infrastructure and a production system in which the innovative performance of an economy depends on the innovative capabilities of firms and research institutions, and on the ways they interact with each other" through interactive learning.[59] More narrowly defined, Technopoles are important institutional infrastructures for technology transfers that include university and research labs, knowledge intensive enterprises, and specialized services.[60] Technopoles were introduced in the "late 1970s by the Technopolis project in Japan and the Technopolis policy in France."[61]

Although most of the popular HTTCs were discovered in trade and news sources, the majority corresponds with the Milken Institute's 1998 listing of the most high-tech metropolitan areas and Tech-Poles.[62] The Milken Institute's listing includes the top high-tech metropolitan areas, based on high-tech output, and the top Tech-Poles, based on the relative technology gravitational pull of a technology production center.[63]

& Norman J. Glickman, *R&D as an Economic Development Strategy*, 52 J. AM. PLAN. ASS'N 407, 408 (1986) (describing Austin as a region dedicated to high-tech manufacturing, research and development).

[56] Knox, *supra* note 4, at 202; *see also* Andrews, *supra* note 45, at 21 (noting that AOL and other businesses relocated to Loudoun County in 1996 because of the available space, fast-track permit process, and access to the Dulles International Airport).

[57] *See* W. VA UNIV. ECON. OUTLOOK, I-79 HIGH-TECH CORRIDOR REGION OUTLOOK FORECAST: 2001–2006 (July 2002) [hereinafter I-79 HIGH-TECH CORRIDOR].

[58] *See* D. Doloreux, *What We Should Know About Regional Systems of Innovation*, 24 TECH SOC'Y 243, 247–48 (2002) (stating that RSI involves interactions between private and public sectors, and policy-oriented regional innovation).

[59] *Id.* at 243.

[60] *Id.* at 254.

[61] *Id.*

[62] ROSS C. DEVOL, AMERICA'S HIGH-TECH ECONOMY 69 (1999); *see also* PAUL D. GOTTLIEB, OLDER CENTRAL COUNTIES IN THE NEW ECONOMY 22 (2001) (regarding the importance of higher-education technopoles in Southern California).

[63] *See* DEVOL, *supra* note 62, at 64, 67 (comparing the "Top 50 High-Tech Metros, by Size to the Top 50 Milken Institute Tech-Poles").

II. HTTC Formation and Economic Diversity

Inner-city commercial strips were developed in the 1920s as linear expansions of downtown with traditional neighborhood retail and service oriented mini-markets, liquor stores, discount stores, and beauty salons.[64] After World War II, in the 1950s, there were plant closings, hard financial times, and a decline in inner-city commercial strips.[65] In the 1960s, "the federal highway construction program often segmented and socially isolated [these] poor inner-city neighborhoods."[66] For example, the Over the Rhine neighborhood, on the edge of the Cincinnati's active downtown and riverfront areas, was split by the construction of Interstate 75; the property values plunged, and the neighborhood became a ghetto.[67] The new highways contributed to the increasing economic marginality of downtowns in the 1970s and 1980s.[68]

"In the 1970s, the U.S. witnessed its fair share of plant closings and industrial downsizing throughout the country. Across the U.S., heavy manufacturing was steadily declining as overseas competition and foreign, cheap labor forced a number of businesses to shut down. This left many cities financially devastated."[69] Given the large number of under-educated and unemployed factory workers, the federal Economic Development Administration, U.S. Department of Agriculture, U.S. Department of Health and Human Services, and U.S. Department of Housing and Urban Development began to invest in small business incubators.[70] This solution not only created new uses for old, abandoned factory buildings, but put labor back to work and hope into distressed communities.

The mid-1970s marked a shift toward a service economy.[71] "The 'Rust Belt' states Illinois, Michigan, Ohio, and Pennsylvania—

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[64] Anastasia Loukaitou-Sideris, *Revisiting Inner-City Strips: A Framework for Community and Economic Development*, 14(2) Econ. Dev. Q. 165, 166 (2000).

[65] *Id.*

[66] *Id.*

[67] *See* Andrews, *supra* note 45, at 18 (noting that Now Over the Rhine is a thriving bar and coffeehouse district with good Internet access, low rents, and cultural amenities for high-tech employees).

[68] *See* Loukaitou-Sideris, *supra* note 64, at 166 (discussing how the "majority of inner-city strips experienced an accelerated loss of business in the 1970s and 1980s").

[69] Clovia Hamilton, *University Technology Transfer and Economic Development: Proposed Cooperative Economic Development Agreements Under the Bayh-Dole Act*, 36 J. Marshall L. Rev. 397, 404 (2003).

[70] *Id.* at 405.

[71] *Id.*

that dominated during the industrial age, were now suffering from . . . . factory abandonment, unemployment, out migration, loss of electoral votes, and overall decline."[72] To counteract the suffering, business incubators were opened to create economic development via a growth in jobs.[73] One of the first modern forms of business incubators started in Pennsylvania, and still continues to operate today.[74]

"By the 1980s, the expansion or introduction of non-manufacturing industries had revitalized the economies in some Rust Belt cities."[75] In addition, there was "a high rate of adoption and diffusion of new forms of work and production organization in the Midwest accelerated by globalization, particularly by the influx of transplant manufacturers who have transferred new production systems to the region."[76]

"However, by 1980, there were fewer than ten incubators open in the U.S. Thus, the use of incubators to foster economic development through job growth seemed to require something more."[77] Given the alarm about the declining trend of American economic and technological competitiveness, in 1980, Congress passed legislation, such as the Bayh-Dole Act, to stimulate the transfer to industry of knowledge, technology, know-how, and trained people in the interest of economic development.[78] Universities have played an integral role in industrial development since the Morrill Act of 1862.[79] Small business incubators were set up for university and federal lab high-technology commercialization and universities currently sponsor most of the technology incubators.[80]

The Association of University Technology Managers (AUTM) reports an impressive creation of hundreds of thousands of jobs and the generation of tens of billions of dollars each year in high-

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[72] *Id.*

[73] *Id.*

[74] *Id.*

[75] *See* Hamilton, *supra* note 69, at 405.

[76] Richard Florida, *Regional Creative Destruction: Production Organization, Globalization, and the Economic Transformation of the Midwest*, 72 ECON. GEOGRAPHY 314, 314 (1996).

[77] Hamilton, *supra* note 69, at 405.

[78] *Id.* at 405–06.

[79] *See id.* at 398, 408 ("licensing activity has had a substantial economic impact").

[80] *See id.* at 411 (suggesting that it is critical for universities "to work closely with local government and economic development agencies and industry partners").

tech industries.[81] However, "the vast majority of small new firms are not high job generators in the short term" and "incubators will never be able to replace the number of jobs lost within a community due to downsizing and the disappearing manufacturing base."[82] Yet, university and government funded incubators are not the only source of high-tech job generation. They supplement corporate activities.

Evidence shows "that high-technology industries are better job generators than other manufacturing industries."[83] From an economic development planning point of view, high-tech industries are more attractive targets of job growth.[84] Yet, the jobs that are created in high-tech arenas are obviously for highly skilled professional services providers (i.e., research and development, accounting, business management, and law). For example, between 1995 and 2000, in West Virginia there was a ten percent job loss in the mining sector along West Virginia's HTTC (I-79).[85] Yet, there were increases in business services. Thus, as skill requirements change rapidly, favoring high-end professional and business services, there are fewer jobs for the low-skilled central city residents.[86] A Boston-area study revealed "less-educated job seekers are slightly more concentrated in the central city than are the job opportunities suitable for them."[87] Although "low-income residential neighborhoods in the central city are mostly opportunity poor," they are located relatively close to opportunity-rich commercial and industrial areas.[88] Unfortunately, job data about each high-tech corridor is not readily available.

Although, it is expected that poorer counties will see little benefit from high-tech development, there are inherent differences between research and development functions and production functions.[89] These functions are often in separate locations and have obviously different employment requirements.[90] There is also a

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[81] *Id.* at 412.

[82] *Id.* at 413.

[83] Wim Wiewel et al., *Planners, Technology, and Economic Growth*, 50 J. AM. PLAN. ASS'N 290, 293 (1984).

[84] *Id.*

[85] I-79 HIGH-TECH CORRIDOR, *supra* note 57.

[86] JOSEPH PERSKY & WIM WIEWEL, WHEN CORPORATIONS LEAVE TOWN: THE COSTS AND BENEFITS OF METROPOLITAN JOB SPRAWL 16 (2000).

[87] Quing Shen, *A Spatial Analysis of Job Openings and Access in a U.S. Metropolitan Area*, 67 J. AM. PLAN. ASS'N 53, 59 (2001).

[88] *Id.* at 64.

[89] Wiewel et al., *supra* note 83, at 293.

[90] *See id.*

social division of labor which "involves the parceling out of different tasks between individual production units . . . in a pattern of vertical disintegration [of production]," such as the relationship between contractors and subcontractors.[91] Thus, governments need to plan for a diverse mix of low and high skill jobs.

An interesting report on the Harvard Civil Rights Project found "[e]vidence of the trend towards segregation can be found in census data gathered from the Boston area."[92] In a 2000 census, evidence indicated that suburban communities surrounding Route 128 received an influx of middle class minorities.[93] However, this influx of minorities has a direct correlation to the dramatic decline in the white population.[94] "More than 124,700 white people moved further out into the 'high-tech corridor' along I-495, an area that is almost 93 percent white."[95] However, an alternate viewpoint is that as residential communities along Route 128 become built up and more costly, many techies are moving farther out, closer to I-495.[96]

This current lack of economic diversity with a good mix of low-skill and high-skill jobs representing both the services and manufacturing sectors is detrimental.[97] Even smart growth strategies are inadequate since they do not combine place and people strategies to ensure job and wealth building opportunities for all; and that "[w]orkforce development and transportation policies are inexorably linked."[98]

Little is known about the potential effects of the spatially dispersed high-tech economic revolution on industrial location pat-

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[91] ALLEN J. SCOTT, TECHNOPOLIS 19 (1993).

[92] Hill, *supra* note 33.

[93] *Id.*

[94] *Id.*

[95] *Id.*

[96] Nathan Cobb, *'Nerdistan' Downloading the Good Life in Boston's Silicon Suburbs*, THE BOSTON GLOBE, July 11, 1999, http://www.boston.com/globe/search/stories/reprints/goodlife100199.htm (last visited Mar. 20, 2004); *see* Sheryl D. Cashin, *Civil Rights in the New Decade: The Geography of Opportunity*, 31 CUMB. L. REV. 467, 471 (2000–2001) (observing that the black middle class tends to move away from areas of highest high-tech growth, and that there is a geographic separation of the races and classes); *see also* GOTTLIEB, *supra* note 62, at 32, 35 (showing that in the author's Cuyahoga County case study, the scarcity of tech-oriented knowledge workers in minority neighborhoods raises issues of equity).

[97] *See* Angela Glover Blackwell, *Promoting Equitable Development*, 34 IND. L. REV. 1273, 1288–89 (2000–2001) (focusing on connecting low-income people to good quality jobs).

[98] *Id.* at 1279.

terns, or on the urban condition.[99] Without new policy approaches that create partnerships among urban cores and industry, state governments, and suburban jurisdictions, "the economies of many older, higher cost metropolitan areas and many central cities and older inner suburbs are likely to face further job loss and disinvestments, leading to underutilization of the built environment, potentially reduced central city benefits for industry, increased poverty and ghettoization, and fiscal problems."[100]

Further, employment diversification by type of job activity and among sectors makes a region less "vulnerable both to cyclical and to structural or competitive effects."[101] Currently, "we have levels of income inequality not seen since the 1930s. And the issue isn't simply one of social justice or equitable distribution of rewards. It is a matter of functional inequality—and creative waste. Seventy percent of the workforce does not have the opportunity to do valuable creative work."[102] Thus, workforce development is critical to the development of equitable HTTCs.

In addition to the Bayh Dole Act, the 1980s experienced a defense buildup, and the defense regions grew faster than the rest of the nation.[103] High-tech scientists and engineers left the Midwest and Middle Atlantic for defense jobs in the Gunbelt: the Pacific, South Atlantic, New England, and Mountain regions.[104] Empirical analysis is available, confirming that pools of scientists and engineers are concentrated in New England, Florida, Texas, the Intermountain West, and the Pacific region known as the defense perimeter.[105] Therefore, universities, federal research labs, and high-tech military training centers are integral to the development of HTTCs.

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[99] OFFICE OF TECH. ASSESSMENT, CONGRESS OF THE U.S., THE TECHNOLOGICAL RESHAPING OF METROPOLITAN AMERICA 1 (1995) [hereinafter TECHNOLOGICAL RESHAPING].

[100] *Id.* at iii.

[101] Malecki, *supra* note 14, at 265.

[102] Richard Florida, *The New American Dream*, WASH. MONTHLY, Mar. 2003, http://www.washingtonmonthly.com/features/2003/0303.florida.html (last visited Mar. 20, 2004).

[103] *See* Scott Campbell, *Interregional Migration of Defense Scientists and Engineers to the Gunbelt During the 1980s*, 69 ECON. GEOGRAPHY 204, 216, Apr. 1993 (suggesting an association "between a region's defense and its growth rate").

[104] *See id.* at 213–14 (reflecting both changes in the labor market and the area's population concentration).

[105] Mark Ellis et al., *Defense Spending and Interregional Labor Migration*, 69 ECON. GEOGRAPHY 182, 199 (1993).

III. Transportation's Roles in Economic Development

Transportation's roles in economic development are obvious. It is clear that the construction of transportation facilities creates jobs and moves goods, which in turn stimulates the economy. It is also immediately evident that providing access and movement of people and goods support economic activities.[106] Access is critical to firms' competitiveness and innovativeness because they will have better access to the resources for their productive activities.[107] "Without the ability to move goods, services, or labor in a cost effective manner into and out of a community, economic development will not occur."[108]

This deduction has been verified through many studies of industrial decision makers.[109] A considerable number of empirical studies have established that there is a strong association between increased levels of employment and industry growth and highway networks.[110] The transportation and access to land use connection cannot be ignored because roads and the prominent fixtures that they serve—i.e., "big-box retail, edge cities, and corporate campuses—are clearly codependent."[111] Further, in some areas, investment in transportation has increased economic activity despite adverse economic developments, such as military base closures, disastrous flooding, or the stagnation of certain industries.[112]

Unfortunately, despite providing for construction related economic development, access, and mobility, current transportation policies encourage costly sprawl. Although suburban development is supported by transportation infrastructure and fosters local economic development in the short-term, there are long-term costs.

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[106] Bachtel et al., *supra* note 6, at 36.

[107] *See* Doloreux, *supra* note 58, at 245 (noting "the success of firms in a particular region and nation, in a given industry, is influenced by four elements: conditions of the local factors; conditions of demands; strategies of relating and supporting industries, and firm strategy; structure, and rivalry").

[108] Bachtel et al., *supra* note 6, at 36.

[109] *Id.*

[110] *Id.* at 15.

[111] Robert Cervero, *Road Expansion, Urban Growth, and Induced Travel: A Path Analysis*, 69(2) J. Am. Plan. Ass'n 145, 159 (2003).

[112] *See* U.S. Dep't Transp., Fed. Highway Admin., Linking The Delta Region With The Nation and The World—The Delta Report (2004) (recalling public investment in highways resulted in improved employment opportunities and quality of life throughout the Delta Region despite the disastrous 1993 Mississippi River flooding, and the stagnation of certain traditional Delta industries such as oil and gas production), *at* http://www.tfhrc.gov/pubrds/winter96/p96w19.htm (last visited Mar. 20, 2004).

However, many scholars consider high-tech economic development and promotion of HTTC tools help alleviate sprawl.[113]

IV. The Sprawl Debate and the Cluster Solution

Some have argued that in the New Economy, geography and business location is a moot issue. They argue that with advanced telecommunications, it is no longer necessary for people who work together to be together.[114] "[O]ne would expect location to diminish in importance. But the opposite is true."[115] People remain highly concentrated in high-tech, knowledge-based industries that drive economic growth.[116]

Vertical disintegration is where specialized, disintegrated producers break up into yet more specialized fragments of economic activity and the high-tech production complex becomes more tightly organized in geographical space.[117] These highly concentrated clusters have been called agglomerations, institutional isomorphism, and homogeneous organizational fields.[118] The clustering of high-tech businesses along transportation facilities helps prevent job sprawl.[119] Sprawl is costly, involving direct onsite costs to improve lots; new neighborhood, community, and regional services; and infrastructure direct costs.[120] In addition, since there is no net benefit to job sprawl, it should be curtailed because it is inequitable, and the direct costs and wasted resources are identifiable losses to overall societal well-being.[121]

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[113] *See* Ed Bolen et al., *Smart Growth: A Review of Programs State by State*, 8 Hastings W.-N.w. J. Envtl. L & Pol'y 145, 145 (2002) (discussing the policy of "smart growth" to combat sprawl).

[114] *See* Richard Florida, The Rise of the Creative Class 219 (2002).

[115] Porter, *supra* note 11, at 90.

[116] *Id.*

[117] *See id.* at 81, 90 (comparing the advantages of clusters to vertical integration).

[118] Arnoud Lagendijk & James Cornford, *Regional Institutions and Knowledge—Tracking New Forms of Regional Development Policy*, 31(2) Geoforum 209, 210, 214 (2000).

[119] *See* Philip D'Anieri, *Persky & Wiewel: When Corporations Leave Town—The Costs and Benefits of Metropolitan Job Sprawl*, 68(3) J. Am. Planning Ass'n 323, 323–24 (2002) (book review) (discussing the implications of job sprawl); *see also* Shen, *supra* note 87, at 58–59 (discussing spatial distribution of job opening and job seekers).

[120] Technological Reshaping, *supra* note 99, at 198.

[121] *See* D'Anieri, *supra* note 119, at 323 (discussing how the authors, Persky and Wiewel, failed to identify any loss of overall societal well being with job sprawl; in fact, the loss is the costs to society).

Job sprawl is inequitable in the sense that as the information-service economy and its highly educated workforce cause some cities to "become stable magnets of high consumption, entertainment, and culture . . . [there are] massive declines in manufacturing employment and increases in poverty."[122] Moreover, with regard to the remaking of our economic geography, as today's professionals gravitate to stimulating creative environments (opportunities, amenities, and openness to diversity), there is a growing geographic segregation of the Creative Class and the other classes.[123]

> While the Creative Class favors openness and diversity, to some degree it is a diversity of elites, limited to highly educated, creative people. Even though the rise of the Creative Class has opened up new avenues of advancement for women and members of ethnic minorities, its existence has certainly failed to put an end to long-standing divisions of race and gender. Within high-tech industries in particular these divisions still seem to hold. [For example, the] world of high-tech creativity doesn't include many African-Americans.[124]

Additionally, the development of HTTCs in suburban areas may accelerate suburban sprawl.[125] Since highways facilitate access to suburban and rural land, HTTCs may naturally form or be created in suburban areas along expressways resulting in lost inner-city population and industrial jobs.[126] Government may be promoting metropolitan sprawl through its transportation policies that subsidize growth machines—e.g., more highways.[127]

Arguably, when firms are located together, there are substantial cost reductions. In clusters, lower transportation costs are attractive.[128] In addition, with respect to site selection and market entry, the lower transportation costs make location "less mate-

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[122] PERSKY & WIEWEL, *supra* note 86, at 15.

[123] *See* FLORIDA, *supra* note 114, at 11 (increasingly opting out of places where tradition is more valued and where the social norms of the organizational age still prevail).

[124] *Id.* at 79–80.

[125] Robert H. Freilich & Bruce G. Peshoff, *The Social Costs of Sprawl*, URB. LAW. 183 (1997) (stating that "suburban communities can reduce the costs of sprawl by addressing connectivity, and encourage the use of urban villages and neo-traditional neighborhoods, both of which emphasize a neighborhood's role").

[126] *See* Lewyn, *supra* note 29, at 193–94 (describing how the city of Atlanta, Georgia lost thousands of people and jobs due to increased highway development).

[127] *See* PERSKY & WIEWEL, *supra* at note 86, at 12.

[128] *See* Dongsheng Zhou & Ilan Vertinsky, *Strategic Location Decisions in a Growing Market*, 31 REGIONAL SCI. & URB. ECON. 523, 530 (2001).

rial in the future" since future "competition will be high anyway."[129] The decrease in transport costs triggers spatial polarization and cluster formation.[130]

When the expenses of producers' interactions are great, coupled with high unit transport costs, producers are more inclined to locate near one another.[131] This occurs primarily where linkages are small in magnitude; transactional economies of scale cannot be obtained; and linkage partnerships have to be continually rebuilt.[132] "Conversely, where [the] linkages are large in scale and regularized in time and space, unit costs will tend to fall and linkage partners will be under less pressure to locate close to one another."[133] Thus, cluster formations depend on linkage characteristics.[134]

"However, when they are agglomerated, firms also face the prospects of tough price competition . . . [and] their access to isolated markets varies with the level of transport costs."[135] "[C]ertain industries grow as a result of reduced transportation costs, whereas others shrink as economic activity relocates."[136] Further, in addition to price competition, there is spatial competition. This spatial competition involves rival entry (i.e., early market entrants versus deterred late entrants).[137] The first entrants choose central locations that maximize deterrence and the late entrants always choose peripheral locations at the end point farthest from the first firm's location in order to minimize competition.[138] This choice of location depends on the rival's fixed cost, market growth rate, current interest rates, and transportation costs.[139]

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[129] *Id.*

[130] *See id.* (explaining how lower transportation costs make central location more appealing).

[131] ALLEN J. SCOTT, METROPOLIS 184 (1988).

[132] *Id.* at 184–85.

[133] *Id.* at 185.

[134] *See id.* (discussing the role linkage characteristics play in spatial responses to functional interrelationships between industries).

[135] Paul Belleflamme et al., *An Economic Theory of Regional Clusters*, 48(1) J. URB. ECON. 158, 158 (2000).

[136] Amitabh Chandra & Eric Thompson, *Does Public Infrastructure Affect Economic Activity? Evidence From the Rural Interstate Highway System*, 30 REGIONAL SCI. & URB. ECON. 457, 457 (2000).

[137] *See* Zhou & Vertinsky, *supra* note 128, at 530 (describing the spatial competition between first and second entrants).

[138] *Id.*

[139] *See id.* (discussing several factors that affect the particular choice of location).

Also, "very low transportation costs are likely to drive the economy towards more agglomeration in one region at the expense of the other."[140] When product desirability rises, "more firms tend to locate within the same cluster" and the relative size of the cluster increases at the expense of the others because "the relative impact of the localization economies rises with the market size."[141] Thus, economic growth leads to larger cluster formations.

Highways may be perceived as a double-edged sword in the area of development. On the one hand, highways create an increase in economic activity in counties through which they directly pass.[142] On the other hand, while increasing activity in one area, they draw economic viability away from adjacent counties.[143] Thus, with respect to economic development, HTTCs may be exogenous to the rural counties that they run through, and ignoring the endogenous issue would incorrectly characterize the relationship between new HTTCs and economic growth.

Another disadvantage to clustering is that building closer to a city center is more expensive since homes and businesses cost more.[144] Since 1826, the importance of location in determining land value was linked to the ability to ship goods cheaply. In other words, areas closest to the center of the city, those most interconnected have had the highest land values.[145] Whereas the areas located further away have decreased land values due to higher transportation costs.[146]

Perhaps economists know very little about the factors influencing new business location; and taxes and state incentive programs have little effect on location choices.[147] Perhaps in HTTCs, it is the availability of technical expertise that is important to highly sophisticated industries.[148]

There is a change in location patterns whereby a general decentralization of business and professional services is occurring

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[140] Belleflamme et al., *supra* note 135, at 177.

[141] *Id.* at 181.

[142] Chandra & Thompson, *supra* note 136, at 457.

[143] *Id.*

[144] Dunphy, *supra* note 48.

[145] *Id.*

[146] *Id.*

[147] Dennis W. Carlton, *The Location and Employment Choices of New Firms: An Econometric Model with Discrete and Continuous Endogenous Variables*, 65(3) REV. ECON. & STAT. 440, 440 (1983).

[148] *Id.*

which is associated with interfirm flows of information.[149] Information can flow from one firm to another through private communication channels or it can be embodied in skilled professionals who switch jobs; thus, minimizing the cost of acquiring information drives localization.[150] One of the main reasons why firms are induced to locate in close proximity despite tough competition is that technological spillovers (i.e., knowledge sharing or spillover from one firm to the next) are spatially bounded.[151] Firms are induced to cluster despite tough competition because they are spatially bounded by the information and knowledge they share.

However, as the high-tech labor force becomes more proficient and modern, the cost of inputs increase.[152] Once the highly skilled workers and modern infrastructure increase input costs, companies may look for a lower-cost site.[153]

Yet, despite the potential disadvantages to clustering, HTTCs and other clusters have proven to be effective since "[sixty-five] percent of the total output growth differential between metropolitan areas could be explained on the basis of their relative growth in high-technology activity and the level of its concentration."[154]

V. Sustainable and Equitable HTTCs

In the New Economy, successful communities "quickly mobilize . . . to turn innovations into new business ideas and commercial products."[155] This quick mobilization is enhanced with clustered, innovative communities; and over the past two decades, a number of recipes for success have been proffered for high-tech regions. For example, Peltz and Weiss observed that states and localities that are farthest along in high-technology development have integrated five key components into their economic develop-

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[149] *See id.* at 203–08 (describing the background events and history that led to decentralized industry).

[150] *See id.* at 214–15 (explaining why professionals are moving out of metropolitan areas, not suburban areas).

[151] Edmond Baranes & Jean-Philippe Tropeano, *Why Are Technological Spillovers Spatially Bounded? A Market Oriented Approach*, 33 Regional Sci. & Urb. Econ. 445, 447 (2003).

[152] Hamid Noori, *The Transition From Low-Valued Repetitive Manufacturing Sites to Technology Hubs: The Influence of Globally Operating Companies*, 9(1) J. High Tech. Mgmt. Res. 69, 74 (1998).

[153] *Id.*

[154] David R. Kolzow, *Research Universities and the Local High-Tech Economy*, Bus. Xpansion J., *at* http://www.heinz.cmu.edu/~florida/pages/new_economy/media_coverage/research.htm (last visited Mar. 20, 2004).

[155] *Id.*

ment strategy, policy, and planning process.[156] The five broad key components include research and development, entrepreneurship, labor, education, and finance.[157]

Porter suggests that the success of firms in a particular region and nation in a given industry is influenced by four elements: conditions of the locality such as human resources; conditions of local market demands; strategies for relocating and supporting industries; and the integration of firm strategy, structure, and rivalry.[158] Porter also teaches that industry clusters create efficiencies based on the rate of learning and the capacity of innovation.[159]

There are also extensive studies on the typology of industrial districts that anchor income-generating activities. Markusen reported five forms of industrial districts: the Marshallian form, dominated by small, specialty local firms with long-term contracts and highly flexible labor pools; the Italian variant with high incidences of personnel exchanges and a high degree of cooperation among competitor firms; a hub-and-spoke district dominated by one or several large, vertically integrated firms surrounded by smaller and less powerful suppliers; the satellite platform of unconnected satellite branch offices; and the state-anchored district focused on a public-sector institution.[160]

DeVol listed three public policy factors (tax incentives, public investment, and the commercialization of ideas); five comparative location benchmarking factors (cost factors, research institutions, skilled or educated labor force, transportation center, proximity to supplies and markets); and four social infrastructure development factors (attending changing needs, re-education and training facilities, establishing trade groups and affiliations, housing, zoning, quality of life).[161] Public investment, commercialization of ideas, transportation centers, and proximity to supplies and markets were not considered critical to high-tech development.

With respect to growth management, Persky and Wiewel noted five key elements: a lead state or local government actor; the pub-

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[156] Peltz & Weiss, *supra* note 1, at 277.

[157] *Id.*

[158] Michael E. Porter, *The Competitive Advantage of the Inner City*, 7(2) CUPREPORT 4 (1996) [hereinafter *Competitive Advantage*]; *see also* Doloreux, *supra* note 58, at 245 (citing Porter).

[159] *See Competitive Advantage*, *supra* note 158.

[160] Ann Markusen, *Sticky Places in Slippery Space: A Typology of Industrial Districts*, 72(3) ECON. GEOGRAPHY 293, 297–307 (1996).

[161] DEVOL, *supra* note 62, at 98.

lic's involvement in goal-setting and decision making; financial resources; technical resources; and coordination.[162]

Florida advocates that three simple elements are required for economic development—technology, talent, and tolerance (for counter-culture tendencies and diversity).[163] Doloreux suggests that the eight required elements are firms, institutions, a knowledge infrastructure, policy-oriented regional innovation, interactive learning, knowledge production, proximity as an agglomeration or cluster, and social embeddedness.[164]

Kolzow proscribes five factors that indicate technology potential in New Economy communities seeking a competitive advantage.[165] Following Porter and DeVol, Kolzow states that combining New Economy factors as quality of life rankings, presence of a research university, a concentration of high-tech activity, patent generation, and a high level of educational attainment gives an indication of technology potential.[166]

Fundamentally, the approach to achieving sustainable and equitable HTTCs must be comprehensive. Here, thirty factors are offered as the key ingredients needed for a successful high-tech corridor:

- planning
- large strategic planning group to build clout with legislation[167]
- feasibility study
- business plan with cost-benefit analysis, governance, marketing, financing

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[162] PERSKY & WIEWEL, *supra* note 86, at 112–13.

[163] FLORIDA, *supra* note 114, at 249.

[164] Doloreux, *supra* note 58, at 247–51.

[165] Kolzow, *supra* note 154.

[166] *Id.*

[167] *See* Andrews, *supra* note 45, at 19 (describing Cincinnati's Over the Rhine Main Street Ventures that has long-term leases in five buildings, renting space to 15 high-tech enterprises at sub-market rates. Main Street Ventures is designed to create a high-tech community and is supported by contributions from a local law firm, Deloitte & Touche, the chamber of commerce and other businesses); *see also* Lamb, *supra* note 22 (suggesting the University of California at Davis' booming biotechnology corridor of companies along I-80 has formed the Davis Area Technology Association (DATA); there is also a group called UC Davis Connect that links university researchers with private companies in and near Davis; in Florida, there is BioFlorida, a group of 100 companies, research institutions and others that work to promote biotechnology in the state); *see also* BIOTECH & BIOMEDICAL COMPANIES, *supra* note 26, at 2 (rating Florida as third in choice for location for biomedical manufacturers); Starner & Deal, *supra* at note 19 (mentioning that the Corridor Council is anchored by the University of South Florida in Tampa and the University of Central Florida in Orlando).

- strategic plan (with benchmarked strategies, tied to a plan to improve tech transfer from the universities to private industry)
- mixed-use master plan
- presence of government research establishments (federal labs, military, and top ranked research universities[168]) anchoring the corridor[169]
- close contracting relationships between corridor establishments, subcontracts to smaller companies[170]
- venture capital[171]

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[168] *See* David P. Angel, *The Labor Market for Engineers in the U.S. Semiconductor Industry*, 65(2) ECON. GEOGRAPHY 99, 108, 109 (1989) (noting that Berkeley and Stanford are often cited as important to the dramatic growth of the semiconductor industry in Silicon Valley). A majority of entry-level research scientists, circuit design engineers, and production engineers are recruited directly from local universities. *Id.* This source of labor is critical to high technology production. *Id.* Further, "[r]apid changes in product and process technologies mean that engineering skills have a relatively short "half-life" and continuing education is of considerable importance in high technology industries." *Id.* at 109.

[169] *See* DEVOL, *supra* note 62, at 97 (noting that university research establishments are the most important factor in incubating high-tech industries). Although the role of local government is critical to the high-tech development process, "[o]verly active government intervention and public policy may be counterproductive and harmful to the long-term development of high-tech industries." *Id.* The government has played a limited role in establishing high-tech centers. *Id.*; *see also* Andrews, *supra* note 45, at 20 (discussing two national labs, Los Alamos and Sandia, supporting the Albuquerque tech corridor).

[170] *See* Campbell, *supra* note 103, at 204 (stating that Midwestern Universities subsidize bicoastal high-tech regional developments in the Pacific, South Atlantic, New England, and Mountain Gunbelt regions by exporting tech graduates to these faster-growing regions). These regions are growing because of the presence of more defense jobs. *Id.* The term Gunbelt defines the constellation of military industrial districts of defense contractors in New England, Long Island, D.C., Florida, Texas, Colorado, Seattle and Los Angeles. *Id.*; *see also* Enrico Cicotti, *Innovation and Regional Development in a New Perspective: The Challenge for Action in Underdeveloped Regions*, 49(3/4) PROGRESS IN PLAN. 133, 137–138 (1998). Science parks have a "poor relationship with the network of local companies and the limited creation of new jobs." *Id.* at 137. The purpose of science parks' infrastructures should be performing the "direct transfer . . . assistance to small companies involved in relationships with large companies." *Id.* at 138; *see also* GOTTLIEB, *supra* note 62, at 22 (commenting that "clustered firms are more likely to subcontract and utilize just-in-time inventory methods than are nonclustered firms"); SCOTT, *supra* note 91, at 3, 13–14, 19 (noting that vertical disintegration takes the form of a web of relationships between large contractors and a host of subcontractors; and cooperative relationships between firms and government have helped Southern California become "one of the world's largest and most dynamic high-tech manufacturing regions").

[171] Luis R. Gomez-Mejia et al., *Influence of Venture Capitalists on High Tech Management*, 1(1) J. HIGH TECH. MGMT. RES. 103, 103 (1990) ("[V]enture

- positive publicity, good relations with media for positive image building
- competitive workforce (large labor pool,[172] diversity from range in low to high-tech skills,[173] and availability of work force development[174])
- service providers (patent attorneys and accountants)
- regional operations (especially those tied to state and federal government agencies)[175]

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capitalists are deeply involved in establishing policies and monitoring managerial activities in high tech firms.").

[172] *See* CYNTHIA A. KROLL, UC BERKELEY, A GLOBAL RESHAPING OF THE COMPUTER INDUSTRY, FISHER CENTER FOR REAL ESTATE AND URBAN ECONOMICS (1997/1998) (noting that interviews with computer firms indicated that they decided to remain in California's Silicon Valley primarily because of the "skilled labor pool and professional networks, supported by university research and academic programs"), *at* http://groups.haas.berkeley.edu/realestate/Research/Kroll/Globcomp.htm (last visited Mar. 20, 2004). The California computer network boasts many advantages such as the flow of information, proximity to investors, and quality of life. *Id.*

[173] *See* James Hoyt & Tish Matuszek, *Testing the Contribution of Multi-Skilled Employees to the Financial Performance of High-Tech Organizations*, 12 J. HIGH TECH. MGMT. RES. 167, 167 (2001) (providing empirical data that showed "no relationship between [high-tech] employee skill diversity and financial performance").

[174] *See* Alan D. Fischer, *Optics Valley: Can Tucson Stay King of the Hill?*, ARIZ. DAILY STAR, Feb. 25, 2001 (noting that Arizona's Optics Valley is supported by the Pima Community College's program which trains optics technicians), http://www.azstarnet.com/neweconomy/optics.html (last visited Mar. 20, 2004); *see also* Peder Hjorth, *Knowledge Development and Management for Urban Poverty Alleviation*, 27 HABITAT INT'L 381, 386 (2003). Best management approaches should be:

> based on people-centred [sic] networks that can recognize [sic] the talents, intelligence, and creativity that different actors can bring to the work and build on this diversity to inspire greater commitment and achievement. Such an approach creates an opportunity to collect the many, incoherent, ideas and convert them into powerful, collective understanding and action by creating dynamic, collaborative environments that build knowledge strategically, when and where it is needed.

Id.

It should be a flexible, process-oriented strategy that assesses the needs and capacity of the community. *Id.*

[175] *See* Starner & Deal, *supra* note 19 (describing how BellSouth transformed the Cummings Research Park "into a nationally recognized test center for telecommunications technology").

- inexpensive, quality utilities and public infrastructure (power, sewer, fiber,[176] water, natural gas, roads, telecom,[177] people moving systems, and goods moving systems)[178]
- suburban living (work, leisure, green space, creative and cultural)[179]

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[176] *See* Tridib Banerjee, *The Future of Public Space Beyond Invented Streets and Reinvented Places*, 67(1) J. AM. PLAN. ASS'N 9, 18–21 (2001) (discussing the use of public space to reshape the public infrastructure); *see also* Serdar Yilmaz & Mustafa Dinc, *Telecommunications and Regional Development: Evidence from the U.S. States*, 16(3) ECON. DEV. Q. 211, 224 (2002) (describing how "[a]n increase in telecommunications infrastructure increases output growth"); *see* Andrews, *supra* note 45, at 18, 20 (noting that Cincinnati's Over the Rhine neighborhood is over a broadband fiber-optic cable network, which was installed by Cincinnati Bell; Albuquerque's technology corridor includes a fiber-optic information infrastructure being installed in the city sewer system by CityNet of Silver Spring, Maryland).

[177] *See* Yilmaz & Dinc, *supra* note 176, at 224 (finding that although telecommunications infrastructure plays an important role in service sectors' output growth, inefficient use of telecommunications infrastructure in several states suggests overinvestment).

[178] *See* Starner & Deal, *supra* note 19 (referring to how the Alabama Semiconductor Alliance "hired the Lockwood Greene Microelectronics Engineering Group to 'pre-certify' sites for chip plants"). "[Such] sites have more than 200 acres of available land, are serviced by more than 10 million gallons of water per day, carry 16-kilovolt transmission lines and 400-megawatt power capacity, and have access to more than 73.5 million gallons of natural gas per day." *Id.*

[179] Banerjee, *supra* note 176, at 9, 15, 19–20. The very basic concept of conviviality is very relevant to high-tech corridor development. *Id.* at 15. Communal public actions happen in existing public spaces—streets, squares, parks, and other open spaces. *Id.* "[I]ncreasingly public life is flourishing in private places, not just in corporate theme parks, but also in small businesses such as coffee shops, bookstores, and other such third places. Conviviality as a planning goal . . . [can] lead to local economic development, benefiting small businesses." *Id.* at 19–20. With respect to business location, what matters are genuine, tangible relationships that create synergy among those that possess intellectual capital. There has been little expansion of parks and open space systems in American cities in recent decades. *Id.* at 9. "While the wealthy suburbs flaunt their bridle paths, golf courses, jogging trails, tennis courts, and nature reserves, more-moderate-income, older, and inner-city communities struggle to keep up with the growing demand for baseball diamonds, basketball courts, and soccer fields." *Id.*; *see also* FLORIDA, *supra* note 114, at 223 ("regional economic growth is driven by the location choices of creative people . . . who prefer places that are diverse, tolerant and open to new ideas."); Paris M. Rutherford, *Redevelopment: The First Wave,* URBAN LAND, June 2003. Rather than the convenience of location, prospective new residents want lifestyle that provides engaging community interaction and a visually diverse and interesting community form . . .authentic places that have identity tied to individuality." *Id.* at 37.

- diverse economy with diverse types of industries (research and development, small business development and manufacturing).[180]
- access to academia (access to scholars for the interchange of ideas, access to equipment[181], university assistance with real estate and land use deals and with small business development)
- high speed permitting[182]
- good climate
- affordable cost of living
- superior local education (k-12 schools, colleges and universities)
- proximity to state capital to develop clout with legislation[183]
- proximity to major cities
- affordable, tailored research and development space
- open information flow between flexible, open firms in an innovative network of peers[184]

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[180] BACHTEL ET AL., *supra* note 6, at 8. The historic lack of economic diversification in rural areas with small-scale economies, combined with increased agricultural mechanization, led to high levels of unemployment and population loss in some rural counties of Georgia. *Id.* When major employers suffer a slowdown or setback "there are no other viable economic alternatives and people are forced to leave." *Id.* For example, if the government is the major source of revenue and jobs, reduced governmental spending results in work force decline. *See* Angel, *supra* note 171, at 99.

[181] Fischer, *supra* note 177 (noting that firms within Arizona's Optics Valley have access to University of Arizona's Optical Sciences Center, which can do the engineering, development, and manufacturing).

[182] KROLL, *supra* note 175 (citing interviews with Silicon Valley firms that indicated traffic congestion, lack of affordable housing and labor, and cumbersome environmental and other regulatory processes, were the greatest concerns).

[183] SAXENIAN, *supra* note 23, at 27 (offering a contrary viewpoint by observing that Silicon Valley's "distance from established economic and political institutions facilitated experimentation with novel and productive relationships").

[184] Angel, *supra* note 168, at 99.

> [S]emiconductor production in Silicon Valley is accompanied by an intensive localized dynamic of labor mobility in which engineers move between firms in a series of short term employment contracts. Fluid employment relations and high levels of inter-firm worker mobility are shown to be an important dimension of the flexible manufacturing forms emerging in Silicon Valley.

Id.

In response to changes in labor demand, firms are able to adjust their employment base easily, swiftly, and at a low cost. *Id.*; *see also* SAXENIAN, *supra* note 23, at 2–4, 9 (discussing why Silicon Valley has successfully adapted to changing patterns of international competition while Route 128 was losing its competitive edge). The author contends "Silicon Valley has a regional network-based industrial system that promotes collective learning and flexible adjustment among specialist producers of a complex of related technologies. The region's dense social networks and open labor markets encourage experimentation and entrepreneurship." *Id.* at 2. Boston's Route 128 "is based on independent firms that internalize a wide range of productive activities" and

- good labor relations
- inventory of high technology expertise and activities in the corridor[185]
- inventory of high technology infrastructure in the corridor (e.g., computer power, testing equipment and manufacturing capabilities)
- inventory of amenities in the corridor
- high-tech summits
- executive report
- low local tax rates
- reasonably priced and quality housing
- distance education to industries (e.g., computer literacy and business management skills)
- government officials and economic development agencies that are able to successfully recruit start-up companies into high-tech incubators and established companies along the corridor[186]

This model recipe represents a broad universe to provide for a basic accounting of key components necessary to achieve high-tech sustainability along a transportation corridor. This very eclectic and synergistic approach to the development of HTTCs is much more comprehensive in scope than prior models.[187] This recipe for success must be reflected in the current transportation planning legislation, which addresses project and strategy considerations during the planning process.

This eclectic, integrated approach to developing HTTCs is not new. For example, in 1984, Malecki advocated for comprehensive high-tech economic development and argued that the goal is to effectuate and support long-term, higher-quality growth by chang-

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isolate producers from external sources of know-how and information. *Id.* at 3. "Network systems flourish in regional agglomerations where repeated interaction builds shared identities and mutual trust while at the same time intensifying competitive rivalries." *Id.* at 4.

[185] *See* Amy Worgan & Samuel Nunn, *Using Patent Data—Exploring a Complicated Labyrinth: Some Tips on Using Patent Data to Measure Urban and Regional Innovation*, 16(3) ECON DEV. Q. 229, 235 (2002) (patenting activity can provide a schematic of innovative activity). "Patent activity does not reveal any true information about an invention's level of technological initiative, and a firm's decision to pursue a patent may not be static over time." *Id.*

[186] *See* Fischer, *supra* note 174 (noting that efforts to recruit optic firms to move to Arizona's Optics Valley is supported by the efforts of the Arizona Department of Commerce and the Greater Tucson Economic Council). "Statewide optics employment grew 81 percent in five years." *Id.*

[187] *See* Cicotti, *supra* note 170, at 137–38 (stating that an eclectic approach to science parks may motivate different actors to participate and that the author supports an eclectic approach to local development with respect to the development of science parks).

ing the perspective of politicians and local business communities.[188] The decision to create HTTCs must be integrated into a community's overall economic strategy. Yet, today, there is little evidence of effective implementations of such a comprehensive, integrated approach.

An early example of a failed attempt is the Appalachian Development Highway System.[189] This regional system of twenty-one corridor linkages to the interstate system was created by the Appalachian Regional Development Act of 1965.[190] The Act

> required the commission to view economic infrastructural investments and human resource programs as an integral part of overall regional planning. However, the federal funds authorized for the regional program emphasized the construction of highways relative to human resource development [and] less than 8 percent of authorized outlays [were] designated for demonstration health facilities and vocational training programs.[191]

The planning orientation of the Appalachian Regional Commission is toward transportation public works projects rather than human resources.[192]

In the context of public policy decisions, regions need to target national level policies that shape competitive status and allocate public infrastructure.[193] "[V]arious kinds of infrastructure investments (e.g., transportation, communications, education) are critical for future economic growth and innovation within the state and deserve much more attention, from both an analytical and a fiscal perspective."[194]

VI. Federal Transportation Policy, Objective, and Regulations

Although HTTCs can be state routes or city streets, the majority are located along federal interstate routes. Since many state routes and city streets are eligible for federal funding, the federal

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[188] Malecki, *supra* note 14, at 266–268.

[189] *See id.* at 9 (noting the contradiction between the original objectives of the Appalachian Highway Development System).

[190] Howard L. Gauthier, *The Appalachian Development Highway System: Development for Whom?*, 49(2) Econ. Geography 103 (1973).

[191] *Id.*

[192] *Id.*

[193] *See id.* (discussing the Appalachian Regional Development Act).

[194] Samuel Nunn & Amy Worgan, *Spaces of Innovation: Patent Activity in Indiana Metropolitan Areas, 1990 to 1998*, 16(3) Econ. Dev. Q. 237, 249 (2002).

transportation policy and implementation regulations will be further discussed.

The Transportation Equity Act for the 21st Century ("TEA-21")[195] tailors the planning process to meet metropolitan and statewide transportation needs.[196] "Metropolitan transportation planning funding remains a 1 percent takedown from certain authorized programs in Title 23 and in Title 49 has changed to specific funding levels."[197] State Planning and Research "remains a 2 percent set-aside of certain apportionments in Title 23 and in Title 49 has changed to specific funding levels."[198]

According to the National Intermodal Transportation System policy,[199] the National Intermodal Transportation System ("System") consists of "all forms of transportation in a unified, interconnected manner, including the transportation systems of the future, to reduce energy consumption and air pollution while promoting economic development and supporting the United States' preeminent position in international commerce."[200] The System includes the National Highway System (NHS), which encompasses the Dwight D. Eisenhower System of Interstate and Defense Highways.[201] The NHS is comprised of the "principal arterial roads that are essential for interstate and regional commerce and travel, national defense, intermodal transfer facilities, and international commerce and border crossings."[202]

The current policy states that the "System shall give special emphasis to the contributions of the transportation sectors to increased productivity growth. Social benefits must be considered with particular attention to the external benefits of reduced air pollution, reduced traffic congestion, and other aspects of the quality of life in the United States."[203] Thus, this policy reflects the

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[195] 23 U.S.C. § 101 (2000). "TEA authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998–2003. The TEA-21 Restoration Act, enacted July 22, 1998, provided technical correction to the original law." FEDERAL HIGHWAY ADMINISTRATION, U.S. DEP'T OF TRANSP., TEA-21—TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY MOVING AMERICANS INTO THE 21ST CENTURY, *at* http://www.fhwa.dot.gov/tea21/index.htm (last visited Mar. 20, 2004) [hereinafter TEA-21].

[196] *See* TEA-21, *supra* note 195.

[197] *Id.*

[198] *Id.*

[199] 49 U.S.C. § 5501 (2000).

[200] *Id.* § 5501(b)(1).

[201] *Id.* § 5501(b)(2).

[202] *Id.*

[203] *Id.* § 5501(b)(5).

pedestrian viewpoint that transportation routes are essential to commerce, travel, and defense. It also reflects the common viewpoint that transportation must provide for social benefits, such as quality of life. The less common viewpoint among transportation planning practitioners is that System priorities must include activities that increase the growth of productivity. There is a lack of stewardship by transportation planning professionals for increasing production and economic development. They are commonly focused on alleviating traffic congestion with expansion, addressing citizen complaints, handling safety concerns, and providing maintenance.

Transportation as an economic development tool is secondary in the sense that so long as constituents are satisfied, they will be productive.[204] Even when transportation planners and engineers review site plans for master-planned commercial or mixed-use communities, their goal is to alleviate traffic congestion, provide for parking, and other transportation functions.[205] They do not play a major role in the comprehensive planning required for the development of sustainable and equitable HTTCs.[206]

Despite current practices, innovation and productivity are provided for in the current federal transportation policy. The policy states that:

> [t]he National Intermodal Transportation System must be operated and maintained with insistent attention to the concepts of innovation, competition, energy efficiency, productivity, growth, and accountability. Practices that resulted in the lengthy and overly costly construction of the Dwight D. Eisenhower System of Interstate and Defense Highways must be confronted and stopped.[207]

It also states that the System "must be the centerpiece of a national investment commitment to create the new wealth of the United States for the 21st century."[208] Unfortunately, this current policy does not clearly reflect the current trend toward clustered high-tech business development along transportation routes, and how these HTTCs can be developed and sustained in an equitable way.

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[204] *See* Oliver A. Pollard, III, *Smart Growth and Sustainable Transportation: Can We Get There From Here?*, 29 FORDHAM URB. L.J. 1529, 1549–1554 (2002).

[205] *See id.*

[206] *Id.* at 1549 ("It is not possible to significantly reduce the need for driving without addressing land development patterns and community design.").

[207] 49 U.S.C. § 5501(b)(6).

[208] *Id.* § 5501(b)(9).

Transportation planning regulations are used to implement the current policy. In metropolitan areas,

> [i]t is in the national interest to encourage and promote the safe and efficient management, operation, and development of surface transportation systems that will serve the mobility needs of people and freight and foster economic growth and development within and through urbanized areas, while minimizing transportation-related fuel consumption and air pollution.[209]

As with the System policy, this objective does not reflect the current trend toward HTTC development and the need for developing HTTCs in a sustainable and equitable manner.

To accomplish this objective, Metropolitan Planning Organizations (MPOs) are designated to "develop transportation plans and programs for urbanized areas of the State."[210] "The plans and programs for each metropolitan area shall provide for the development and integrated management and operation of . . . an intermodal transportation system for the metropolitan area and as an integral part of [a national] System."[211]

The process for developing the plans and programs is to be "continuing, cooperative, and comprehensive . . . based on the complexity of the transportation problems to be addressed."[212] With respect to HTTCs, the complex transportation problem that must be addressed is the need for the sustainable and equitable development of clustered, high-tech businesses along transportation routes.

MPOs are designated for each urbanized area with a population of more than 50,000 individuals:

> by agreement between the Governor and units of general purpose local government that together represent at least 75 percent of the affected population (including the central city or cities as defined by the Bureau of the Census); or . . . in accordance with procedures established by applicable State or local law.[213]

MPOs with transportation management areas have policy boards.[214] In addition, each individual public agency with multimodal transportation responsibilities is to create an agenda and

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[209] 23 U.S.C. § 134(a)(1) (2000).
[210] *Id.* § 134(a)(2).
[211] *Id.* § 134(a)(3).
[212] *Id.* § 134(a)(4).
[213] *Id.* § 134(b)(1)(A)–(B).
[214] *See id.* § 134(b)(2)(A)–(C) (stating that the boards "include local elected officials; [ ]officials of public agencies that administer or operate major modes of transportation in the metropolitan area . . . and [ ] appropriate State officials).

plans for adoption by its MPO.[215] The plans for the proposed area should include the existing area and the neighboring area, which is expected to become developed in the next twenty years.[216] This may include the entire metropolitan area or consolidated area determined by the Bureau of the Census.[217]

In large part, MPOs typically consider projects and strategies that will "increase the safety and security of the transportation system for motorized and nonmotorized users; [ ]increase the accessibility and mobility options available to people and for freight; [ ]protect and enhance the environment, promote energy conservation, and improve quality of life."[218] They also consider projects and strategies that build upon the intermixing and connection of transportation systems between people and goods, while incorporating the existing transportation system.[219] Previous transportation legislation consisted of compiling sixteen metropolitan and twenty-three statewide planning features.[220] The legislation has now been consolidated in seven areas, applicable both to the city and rural areas.[221]

With respect to HTTCs, however, MPOs would likely fail to meet the requirement to consider projects and strategies that "support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency."[222] Further, for HTTCs, MPOs' consideration of projects and strategies that "promote efficient system management and operation" would be weak.[223]

The federal transportation regulations also provide that each MPO is to create and regularly update the long-term plan of its transportation system for its metropolitan area.[224] The long-range plan is to identify transportation facilities that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that "serve important national and regional transportation functions."[225] To address the special

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[215] 23 U.S.C. § 134(b)(3)(A).
[216] *Id.* § 134(c)(2)(A)–(B).
[217] *Id.*
[218] *Id.* § 134(f)(1)(B)–(D).
[219] *Id.* § 134(f)(1)(E), (G).
[220] TEA-21, *supra* note 195.
[221] *Id.*
[222] 23 U.S.C. § 134(f)(1)(A).
[223] *Id.* § 134(f)(1)(F).
[224] *Id.* § 134(g)(1).
[225] *Id.* § 134(g)(2)(A).

needs of HTTCs, this requirement should be broadened to emphasize that national and regional transportation functions include providing for sound, sustainable, and equitable economic development.

The long-range strategy is to include a financial plan[226] that provides for "operational improvements, resurfacing, restoration, and rehabilitation" of roads.[227] The financial plan must also provide for "operations, maintenance, modernization, and rehabilitation" of transit facilities.[228] This financial plan is to "make the most efficient use of existing transportation facilities to relieve vehicular congestion and maximize the mobility of people and goods."[229] Unfortunately, with regard to clustered high-tech business development along transportation routes, there is no provision for planning for the creation of a diverse economy with mixed uses from the research, services, and manufacturing sectors.

If MPOs began to steward the planning of HTTCs, true sustainability and equity for the purpose of increasing economic productivity may result. MPOs are required to provide for public comment and participation.[230] Thus, this is an existing forum for strategic and comprehensive planning for the development of HTTCs.

In addition to the long-range plan, each MPO is to develop a short-term Transportation Improvement Program (TIP).[231] The TIP is to be updated at least once every two years and is subject to approval by the MPO and the Governor of the particular state.[232] TIPs are lists of prioritized federally supported projects and strategies that are to be carried out within a three-year period.[233] With regard to the development of HTTCs in metropolitan areas, the requisite comprehensive planning strategy should be included in the TIP.

The federal transportation regulations also provide for statewide planning.[234] Statewide planning and metropolitan planning regulations have the same objective and considerations and similar planning processes. Statewide planning agencies are required

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[226] *Id.* § 134(g)(2)(B).
[227] *Id.* § 134(g)(2)(C)(i).
[228] 23 U.S.C. § 134 (g)(2)(C)(i).
[229] *Id.* § 134(g)(2)(C)(ii).
[230] *Id.* § 134(g)(4).
[231] *Id.* § 134(h)(1)(A).
[232] *Id.* § 134(h)(1)(D).
[233] *Id.* § 134(h)(2)(A).
[234] 23 U.S.C. § 135.

to develop a Statewide Transportation Improvement Program (STIP) which is to be approved no less frequently than biennially by the Secretary of Transportation.[235] The difference between statewide planning and metropolitan planning is that statewide planning requires the development of transportation plans and programs for *all* areas of the state, which is largely rural.[236]

With respect to Smart Growth, the "interests of institutions, groups, and concerns are often in conflict; for example, preserving prime farmland reduces the most suitable land for residential development."[237]

The statewide (rural) transportation planning and metropolitan planning interests, therefore, often conflict and compete. There is little evidence that the economic development promoted by urban-style state and local land use programs reaches the rural poor and redistributes resources to them.[238] Smart Growth policy-making must broadly weigh and consider conflicting and competing interests of urban, suburban, and rural communities.[239] Further, the policy debates will likely generate complex policy and constitutional concerns when business-as-usual processes are reformed. With regard to planning for the development of sustainable and equitable HTTCs, the statewide planning regulations are as inadequate as the metropolitan planning regulations. Complex policy making is essential to improve adequacy.

A. *Transportation Enhancements (TE)*

Why should transportation planning provide for the comprehensive planning of a high-tech business cluster simply because the cluster is located along a transportation corridor? The answer—why not? Transportation planning is supposed to provide for the transportation land use connection and take into consideration all land uses. In fact, Congress has advocated for similar "stretches" in the use of federal transportation dollars.

Transportation Enhancement Activities (paid for with TE funds), for example, continue to be funded through a ten percent

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[235] *Id.* § 135(f)(4).

[236] *Id.* § 135(a)(2) (emphasis added).

[237] James E. Holloway & Donald C. Guy, *Smart Growth and Limits on Government Powers: Effecting Nature, Markets and the Quality of Life Under the Takings and Others Provisions*, 9 DICK. J. ENVTL. L. & POL'Y 421, 425 (2001).

[238] Frank J. Popper, *Rural Land Use Policies and Rural Poverty*, J. AM. PLAN. ASS'N 326, 329 (1984).

[239] *See id.* at 333.

set-aside from STP funds.[240] TE activities include paying for the historic preservation of buildings in the view-shed of a transportation facility.[241] Indeed, the list of eligible TE activities has expanded, "but all projects must relate to surface transportation."[242] Newly eligible include the establishment of transportation museums and tourist centers.[243]

B. Transportation and Community and System Preservation Pilot

With the enactment of TEA-21, Congress recognized the need to investigate the relationships between transportation, communities, System preservation, and private sector based initiatives. This need was addressed with a pilot program called "Transportation and Community and System Preservation."[244] This is a comprehensive initiative of research and grants to plan and implement strategies that improve the efficiency of the transportation system; reduce environmental impacts of transportation; reduce the need for costly future public infrastructure investments; ensure efficient access to jobs, services, and centers of trade; and examine private sector development patterns and investments to support these goals.[245] A total of $120 million is authorized for this program for FYs 1999–2003.[246] This pilot program should therefore be continued, and the investigation of HTTCs should be conducted using this research and grant funding.

C. Welfare to Work

With respect to transportation's role in providing access to jobs, Congress provides the Welfare to Work program under TEA-21.[247] Thus, the idea of planning for workforce development through training is not foreign to the U.S. Department of Transportation.

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[240] TEA-21, *supra* note 195.
[241] *Id.*
[242] *Id.*
[243] *Id.*
[244] *See id.*; *see also* FEDERAL HIGHWAY ADMIN., U.S. DEP'T TRANSP., TRANSP. AND COMMUNITY AND SYSTEM PRESERVATION PILOT PROGRAM (2004), *at* http://www.fhwa.dot.gov/tcsp/ (last visited Mar. 20, 2004) [hereinafter TCSP].
[245] TCSP, *supra* note 244.
[246] *Id.*
[247] FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP., TEA-21 TRANSP. EQUITY ACT FOR THE 21ST CENTURY, REBUILDING AMERICA'S INFRASTRUCTURE (2004), *at* http://www.fhwa.dot.gov/tea21/suminfra.htm (last visited Mar. 20, 2004) [hereinafter AMERICA'S INFRASTRUCTURE].

In fact, to provide job opportunities through training, TEA-21 drafted a new provision that allows States the opportunity to reserve slots for welfare recipients in On-the-Job Training programs, leading to full journey level in skilled highway construction trades.[248] MPOs and statewide planning agencies could also plan for the workforce development needed to create workplace diversity in high-tech business clusters located along transportation routes.

Under Welfare to Work's On-the-Job Training programs, the welfare recipient trainees have access to supportive services programs.[249] Such services include providing pre-employment counseling, orientation to the requirements of the highway construction industry, basic skills improvement, assistance with transportation, child care or other special needs, jobsite mentoring, and post-graduation follow-up.[250]

VII. Proposed Amendments to Federal Transportation Policies and Regulations

There is a lack of stewardship by transportation planning professionals for increasing workforce production and economic development. Transportation planners and engineers are commonly focused on alleviating traffic congestion with expansion, addressing citizen complaints, handling safety concerns, and providing maintenance. Transportation as an economic development tool is secondary in the sense that so long as constituents are satisfied, they will be productive.

The current National Intermodal Transportation System policy does not clearly reflect the current trend toward clustered high-tech business development along transportation routes; and how these HTTCs can be developed and sustained in an equitable way. Although the federal transportation planning process is to address complex transportation problems, the need for the sustainable and equitable development of clustered, high-tech businesses along transportation routes is not clearly provided for in the current transportation planning regulations.

With respect to HTTCs, MPOs and statewide planning agencies would likely fail to meet the requirement to consider projects and strategies that "support the economic vitality of the metropolitan

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[248] *Id.*
[249] *Id.*
[250] *Id.*

area, especially by enabling global competitiveness, productivity, and efficiency."[251] The reason for projected failure is because this regulatory consideration is not specific enough to ensure that the proper planning of HTTCs is conducted. A more specific consideration would be to support economic development of metropolitan areas through planning for transportation facilities that support development of diverse, sustainable, equitable, competitive, productive and efficient uses for land—viewing infrastructure investments and human resource programs as integral to overall regional planning. With this approach, MPOs and statewide planning agencies can have regulatory support to get more involved as stewards of the planning of sustainable and equitable HTTCs.[252] One way to control sprawl using HTTCs is to obtain local governments' cooperation in developing regional strategies, land-use policies, and regulatory mechanisms.[253]

Further, funding the investigation, planning, and development of HTTC projects can be justified as being relevant to Transportation Enhancement Activities. HTTC projects are also related to the U.S. Department of Transportation's Transportation and Community and System Preservation Program, and work force development initiatives. The regulations for these initiatives should be amended to encourage the planning of high-tech business clusters along transportation routes.

VIII. Conclusion

HTTCs are in vogue since transportation routes are the physical infrastructure with a significant impact on clustered business formations. Transportation routes provide the obvious accessibility

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[251] 23 U.S.C. § 134(f)(1)(A) (2000).

[252] Persky & Wiewel, *supra* note 86, at 113.

> Given the importance of transportation in shaping regional growth patterns, and in light of the comprehensive nature of the ISTEA and TEA21 legislation . . . [MPOs] could take on a much broader planning role in some regions. Elsewhere, existing regional planning organizations or councils of governments could take on this function. . . . Thus, there exists the beginning of organizational infrastructure and sufficient programmatic experience to develop serious regionwide growth management programs that can address the issue of deconcentration.

Id.

[253] *See* Robert W. Burchell & Naveed A. Shad, *The Evolution of the Sprawl Debate in the United States*, 5 Hastings W.-Nw. J. Envtl. L. & Pol'y 137, 158 (1999) (noting that although "regional governments are not growing nationally," and "there is virtually no interest in forming new regional governments," regional cooperation exists and there is more willingness to share service delivery systems such as the existing MPO system.).

and mobility required to move goods and people. The corridors are clusters of high-tech firms, and this clustering alleviates sprawl. However, HTTCs are designed to support high-tech jobs for highly skilled people. There is concern that the lack of jobs within these clusters will promote poverty and segregation of the classes.

HTTCs are good tools for revitalizing local and regional economic development. Sustainability and equity, however, are concerns. A comprehensive approach to planning the development of HTTCs is therefore necessary. Comprehensive HTTC development decision-making requires planning, anchoring, funding, publicizing, staffing, providing adequate physical infrastructure, and serving the HTTC constituents. With respect to equity, work force and business diversity along each corridor is essential.

Thus, the decision to create a HTTC must be integrated into a community's overall economic strategy. The planning process should identify the conditions under which specific, specialized strategies, such as high-tech job attraction, will produce the desired benefits.[254] With respect to HTTCs, the current federal transportation legislation should be amended to require that transportation planning officials become stronger and more active partners in making development decisions. These decisions should integrate resource programs and infrastructure needs that provide for the development of equitable and sustainable HTTCs. Planning for high-tech transportation corridors needs to be more transactional than infrastructural. In a cohesive policy-relevant structure, there must be a stronger nexus between socio-economic and transportation policy considerations. Before transportation improvements are programmed for funding along HTTCs, transportation officials should begin to take an active role in ensuring that these high-tech developments are sustainable and equitable in socioeconomic terms.

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[254] Wiewel et al., *supra* note 83, at 295.