Appendix C

Case Studies and Best Practices

1. HIGH PERFORMANCE COMPUTING CENTERS

Today there are approximately 100-150 high-performance computing centers located across the United States.[1] Many of these are located on or near university campuses and the degree of accessibility to these facilities by commercial enterprises is variable. The Massachusetts Green High Performance Computing Center (MGHPCC) in Holyoke would be structured primarily to serve MGHPCC consortium faculty members, but some access will be granted to industry under certain conditions. This arrangement with industry, but focus on academic research, is shared by many of the nation's existing supercomputing centers.[2]

In terms of the impact on the local and regional economy, the smaller HPC facilities typically offer 8-15 jobs. Some of the larger centers, such as those that support Department of Energy or National Science Foundation research, range from 40 to 200 employees.[3] The number of employees depends largely on the services the center provides. Many large centers grounded in research will have staff with expertise in:

- System administration;
- Operations & account management;
- Scientific applications expertise;
- A help line;
- File systems expertise;
- Post-processing and visualization; and
- Code development.

These numerous services require a range of expertise and professionals; hence, the staff of these facilities tends to be larger. While some of these services will be required at the GHPCC, it is anticipated that the number of people likely to be employed by the center will fall on the lower end of the range for HPCs in the near term. Most of the services provided by the GHPCC will be geared toward consortium members' research and data needs.

While not all HPCs directly employ a large number of people, they do seem to enhance the tech savvy reputation of a region. This may be a draw to other information technology businesses, but the link between HPCs and the influx of other businesses to an area is unclear. Some HPCs have had former employees and interns leave and start their own information technology businesses, however, and those individuals may choose to remain local. Their presence expands the technological capabilities of the region, which may encourage economic development in the high tech industry. Many HPCs have indicated that the link between their existence and the local and regional economy has not been well researched or documented.

The Council on Competitiveness has done a significant amount of research on industry success in utilizing high performance computing centers. Their focus has been on how these centers can support U.S. industries, however, and not on the impact these centers have on local and regional economies. The

[1] Council on Competitiveness, Washington, DC.
[2] A Pittsburgh Supercomputing Center representative indicated that many commercial businesses that would require supercomputing capabilities for strategic reasons own and operate their own equipment. Some other businesses do utilize supercomputing centers, but the commercial software licenses for use on high-performance computers is cost prohibitive for many private businesses.
[3] RENCI has 80 employees over 7 locations, according to the RENCI section of the 2007 Annual Report for UNC Chapel Hill; PSC has 90 employees according to PSC representative.

research suggests that much of the economic growth contributed to HPCs has been in the form of faculty engagement and the broader economic impacts that university research has on the local and regional economies.[4] Specifically, the economic growth that is typically touted by HPCs is the amount of federal dollars in research grants that are awarded to users of the center.

With respect to the impact these centers have on the community in general, many HPCs involve themselves in educational activities in the communities in which they reside. For example, the Pittsburgh Supercomputing Center (PSC) has contributed to the local high school curriculum by promoting Science, Technology, Engineering, and Mathematics (STEM) to high schoolers and encouraging them, through their course work, to think of supercomputing as the "third leg of science." HPCs have also conducted educational campaigns encouraging STEM, geared toward undergraduate and graduate students. The Rocky Mountain Supercomputing Center's Computation And Science for Teachers (CAST) program works with teachers to bring to the classroom the same problem-solving, technology-rich approaches currently used in scientific research and in business.[5]

[4] RENCI representative.
[5] http://rmscinc.org/outreach.php

2. CLUSTER DEVELOPMENT AND INNOVATION DISTRICTS[6]

We live in interesting times. Free trade and global competition have created an economic environment in which the prosperity of every community depends on its ability to exploit its strengths, mitigate its weaknesses, take advantage of new opportunities, and avoid a succession of threats.

It is also a time, however, when the national economy and the economy in the Commonwealth are poised to expand after the deepest and longest recession since the Great Depression of the 1930s. Businesses will soon be expanding their operations and many will be increasing their employment. Those communities that are best prepared to exploit their unique advantages AND address issues that businesses view as "deal breakers" will be better poised to win a share of new investment and jobs. For older industrial cities, this will be particularly important for fundamental changes will be needed to change both conditions on the ground and the "cognitive maps" about particular communities that business leaders carry with them when they consider their location decisions.

The Economic Development Self-Assessment (EDSAT) that the City of Holyoke recently completed revealed that compared with other municipalities, the city has an inordinately large number of abandoned, boarded up, and tax delinquent properties; a higher than average level of dilapidated housing, somewhat higher commercial and industrial property tax rates; higher than average burglary, auto theft, robbery, and homicide crime rates; and a labor force that has a smaller proportion of workers who are proficient in English and math. These, of course, pose serious impediments to attracting new business investment to the city and they are unfortunately expensive and time-consuming to remediate.

Yet analysis of the city and the results from the EDSAT survey also reveal a number of very important assets that suggest a potentially brighter side to Holyoke's future. In terms of *economic* factors, Holyoke is blessed with:

- hydroelectric power that provides energy-intensive business with a relatively inexpensive source of power
- construction of the new Massachusetts Green High Performance Computing Center (MGHPCC)
- north-south and east-west interstate highway transportation connecting Holyoke to the Pioneer Valley and the interstate Hartford-Springfield-Holyoke corridor
- nearby universities and colleges that can partner with the city in economic development efforts
- a larger than average number of professional workers who can help staff new industry
- a substantial number of greenfield sites that can be developed as new business locations
- wages and salaries for semi-skilled and mid-level clerical jobs that are competitive with other regions
- housing costs that are more than competitive with other communities
- better than average public transit available to potential manufacturing and general office sites.

[6] Research and writing of this section was led by Dr. Barry Bluestone of the Dukakis Center for Urban and Regional Policy at Northeastern University.

Holyoke also benefits from a range of *political factors* that can help attract industry. The city's political, executive, and administrative leadership has taken steps to make Holyoke a "business-friendly" location. These include:

- developing permit approval processes that are often faster than in competing municipalities
- working hard at maintaining public spaces, enforcing code violations, and monitoring maintenance needs
- working with the arts community to design open space and provide cultural amenities
- working with resident firms to help attract new businesses
- creating extensive collaboration with industry, local business, and ethnic groups

This commitment to working with business to help solve business's problems and working together throughout the community to redevelop Holyoke can form the basis for a new era of economic prosperity in the city.

What is needed is a comprehensive development strategy that builds on these particular strengths to create districts within the city and in the region where clusters of businesses, both existing and new ones, can grow and prosper. The combination of inexpensive green electric energy, exceptional transportation options, the new high performance computing center, affordable housing, the engagement of the region's universities and colleges, and a city leadership team ready to roll up its sleeves and get to work collaboratively with the business community provides the foundation for the successful development of industrial districts, innovation districts, and cluster developments that could serve the city well.

2.1 Cluster Development

As the National Governors Association put it in their 2002 *Governor's Guide to Cluster-Based Economic Development*,

Conceptually, industry clusters have become the *sine qua non* of economic development policy across the United States. State economies, because of historical accident or investments, targeted recruitment, or geographic peculiarities, have distinctive structures. Certain industries are more highly concentrated in some places than others. The competitive advantages of various regions of a state are best understood by competitive advantage of their most prominent industries. Every place wants to be exceptionally good at something that can be translated into reputation and success in the marketplace.[i]

A cluster is generally defined as a "geographically bounded concentration of similar, related, or complementary businesses, with active channels for business transactions, communications and dialogue, that share specialized infrastructure, labor markets and services, and that are faced with common opportunities and threats."[ii] Clusters occur because companies tend to locate near one another to take advantage of common suppliers, customized support services, and access to a common pool of specialized labor and knowledge.

The greatest advantage of clustering is "access to innovation, knowledge, and know-how."[iii] Thus, the Kendall Square neighborhood of Cambridge, with its proximity to Harvard and MIT, has spawned a high tech cluster second to none in the world. The Longwood Medical Area (LMA) in Boston houses a concentrated complex of hospitals and clinics. Leominster, Massachusetts continues to maintain a strong

cluster of plastics manufacturers and plastic extrusion firms. All of these take advantage of access to ideas and specialized talent. Clustering gives firms quicker information about advances in technologies and changes in customer or consumer preferences.[iv] Firms co-locate to take advantage of common infrastructure, labor markets, production processes, technologies, and transportation and transaction costs.[v]

The Governor's Guide lists a number of "hard" and "soft" benefits from clustering. Among the hard benefits are more efficient business transactions, wiser investments, and reduced expenditures that produce profits and jobs. Soft benefits are "derived from the learning, benchmarking, and sharing that expands knowledge and leads to innovation, imitation, and improvement."[vi]

Hard benefit assets include local supply chains that result in design efficiencies, a specialized workforce producing higher productivity, specialized services that promote faster and easier access, a better choice of inputs which lower costs and improve quality, and range of firms which provide for joint ventures and network opportunities.

Soft benefits assets include association which promotes collective vision and planning, trust that promotes inter-firm collaboration, technology transfer through learning, and informal labor markets that provide career ladders.[vii]
For all these reasons, economic development occurs faster, promoting more investment and more employment, in regions that are able to foster and encourage industry clusters to develop.

2.2 Industrial Districts

Geographically, clusters normally develop within "industrial districts." In an earlier period, regional economic activity was defined as occurring in "industrial districts" which took several forms.[viii]

- *Marshallian Industrial Districts* are based on a business structure dominated by small, locally-owned firms where investment is locally generated, scale economies are generally low, there is substantial intrafirm trade among suppliers based on long-term contracts, specialized sources of technical expertise provide a competitive advantage, and there is an evolution of a unique local cultural identity.

- *Hub-and-Spoke Districts* are dominated by a small number of large, vertically integrated firms surrounded by suppliers, a geographically diverse supplier chain, substantial scale economies, local and global investment, and a high degree of public involvement in providing infrastructure.

- *Satellite Industrial Platforms* are dominated by large, externally owned and headquartered firms with minimal intradistrict trade among buyers, sellers, and suppliers, global rather than local investment, where growth is jeopardized by the portability of plants and activities.

- *State-Anchored Industrial Districts* are dominated by a large public institution such as a military base or a large public university, surrounded by local suppliers, and a high degree of public involvement in providing infrastructure.

An example of the *Marshallian industrial district* can be found in the Leominster plastics industry mentioned above or in the machine tool industry in and around Worcester or the once flourishing brass industry in western Connecticut and apparel in Fall River and New Bedford. As long as the industry remains competitive, these small-firm-based industrial districts can flourish. But once other regions, often foreign ones, begin to seriously compete, these small firms have little resilience. Even in state-of-the art industries like solar panels, small firms can find it difficult to remain in full operation in their birthplace. Evergreen Solar in Massachusetts is a case in point, forced by Chinese competition to move much of their manufacturing operations to Asia while maintaining their research headquarters in the Commonwealth. Boeing in Seattle, Washington provides a good example of a *Hub-and-Spoke industrial district* along with Pratt & Whitney in East Hartford, Connecticut. In each case a single large firm buys from both local and external suppliers and sells chiefly to external customers.[ix] In both of these cases, however, these urban regions have benefited from having several large industries in their hubs. Beside Boeing, Seattle has Weyerhauser as a major resource-sector company, Microsoft as its leading high technology company, and the Port of Seattle as a transportation hub.[x] Beside aircraft engine production, Hartford was for decades well served by its insurance industry.

Satellite Platforms involve a congregation of branch facilities of externally-based multiplant firms. Tenants in such industrial districts may range from routine assembly operations to sophisticated research. Research Triangle in North Carolina fits the definition of a satellite platform, housing a collection of unrelated research centers of major multinational corporations.[xi] Markusen notes that Elkart, Indiana is another case of a satellite platform, in this case being a center for auto-related branch plants based on relatively low wages for assembly work.[xii] As noted above, the resilience of satellite platform based industrial districts can be placed in jeopardy by reason of external ownership. Only those based on a concentration of high-skilled labor as in Research Triangle Park are relatively immune to capital flight. *State-Anchored Industrial Districts* are similar to the hub-and-spoke model, but depend on a large public institution or set of public institutions for their economic success. These range from cities like Santa Fe, New Mexico and San Diego, California anchored by major military installations to cities like Ann Arbor, Michigan; Madison, Wisconsin; and Austin, Texas where major research universities provide the "anchor tenants" for a web of private research and service companies drawn to these regions to take advantage of a highly talented labor force. These regions tend to be quite stable because these anchor tenants rarely relocate. Only a major military realignment of resources or public fiscal crises can undermine the viability of districts built on such an industrial base.

2.3 Economic Viability

The long term growth prospects for each of these types of industrial districts is largely based on the strength of *agglomeration economies* – lower business costs associated with being near other producers in the same set of industries, proximity to a constantly replenishing source of skilled labor, and proximity to critical business services or public infrastructure that are hard to replicate elsewhere. Where agglomeration economies are low, firms can easily move to other locations in response to relatively small differences in labor costs, taxes, subsidies, energy, or transportation costs. Where agglomeration economies are large, locations tend to become "sticky places," to use Markusen's term, where even reasonably substantial differences in these factors are not sufficient to offset the benefits of agglomeration.[xiii] Such municipalities tend to be more economically resilient than others.

The one major downside to an overdependence on a single industrial cluster in a community is that other industries may tend to shy away from investing in the region for fear of having to compete for labor and other resources. Hence, Pittsburgh's early dependence on steel and even more so Detroit's agglomerative

specialization in the auto industry deprived these cities of much needed business diversification once the competitive advantage of their primary industries began to deteriorate. The lesson here is that an industry cluster in a single region can be too concentrated to ensure long term prosperity.[xiv]

An intriguing question, according to Markusen, is whether regions "can maintain their stickiness by transforming themselves from one type of district to another."[xv] Nearly a century ago, Detroit began its transformation from a Marshallian small business region to an oligopolistic hub-and-spoke district, which provided it with higher incomes than virtually anywhere else in the nation. On the other hand, it may be possible for a hub-and-spoke district to morph into a Marshallian district with many small, but viable high technology businesses serving as distant suppliers to distant large corporations. Hundreds of small firms throughout New England serve the aerospace industry. Despite the demise of the Douglas and McDonnell aircraft companies in Los Angeles, many of the small highly sophisticated aircraft parts manufacturers in that metropolitan region remain in business selling their wares to Boeing, Airbus Industries in Europe, and jet engine manufacturers in the U.S. and in the United Kingdom.

In the end, Markusen suggests that "sticky places are complex products of multiple forces: corporate strategies, industrial structures, profit cycles, state priorities, local and national politics."[xvi] A combination of state investment in an anchor institution, business-friendly local government policies and practices, and a focus on exploiting a limited resource such as inexpensive energy or high-skilled labor can provide the economic and political environment in which agglomeration economies can be realized. Such economies are attractive to business and can provide the basis for sustained economic development.

2.4 Innovation Districts

Industrial districts can be based on low tech, middle tech, or high tech production. In contrast, *innovation districts* are generally those where new discoveries and inventions lead to new products or services, usually high-tech in nature. While such districts provide a co-location for producers, what makes them different is that they serve as a *co-location of innovators.*[xvii] Agglomeration in innovation districts follows from a concentration of entrepreneurs, inventors, and knowledge workers. Innovation districts are places that attract and exploit what Richard Florida has dubbed the "creative class."[xviii]

The most widely noted early innovation district in the U.S. is California's Silicon Valley centered in San Jose. Anna Lee Saxenian, in her classic study of the Valley, surmised that the region is best viewed as an American variant of the industrial districts of Europe – technologically dynamic regional economies in which networks of specialist producers both compete and cooperate in response to fast-changing global markets. In these districts, technical skill and competence are widely diffused, small and medium sized firms achieve external economies through complex supplier and subcontracting relations, and the region (not the firm) is the locus of production. The result is a decentralized system which is more flexible than the traditional vertically integrated corporation.[xix]

The late Bennett Harrison in studying Silicon Valley maintained that the "system's performance rests on a dense thicket of supportive institutions, from universities and technical institutes to trade associations and consulting groups. The sense of community is maintained by frequent trades shows, conferences, seminars, and other forums."[xx]

Venture capitalists also play a critical role in innovation districts, providing high risk investment dollars to small start-up companies with still unproven track records. *Extraordinarily gifted scientists and engineers*, *dedicated entrepreneurs*, and *wealthy venture capitalists* are three of the necessary ingredients for a successful

innovation district. The fourth is *public investment in basic research and in early development*, through federal programs including the Defense Advanced Research Projects Agency (DARPA), the National Science Foundation (NSF), and the National Institutes of Health (NIH), as well as such state initiatives as the Massachusetts Life Sciences Center. These are all important at least in the early stages of an innovation district. Because so much of these investments flow through research universities, virtually all of the most renowned innovation districts are located in regions with such institutions.

While mature, well-established innovation districts such as Silicon Valley, Redmond, Washington, and Cambridge, Massachusetts are now dominated by the huge multinational corporations some of their early startups became – in this case, Intel, Microsoft, and Genzyme – small firms continue to play a central role in newly emerging districts. As such, Clark et.al. have found in an extensive analysis of patent activity that some metropolitan regions (MSAs) have a high rate of patents issued to small firms while in others patent activity is concentrated in larger established companies. Small firms dominate in such MSAs as San Diego; Boston; San Francisco-Oakland-San Jose; Raleigh-Durham-Chapel Hill; Fort Collins, Colorado; Madison, Wisconsin; and Santa Barbara, California. Research universities in these cities play an important role in the high patent activity among smaller firms as university labs provide the fodder for technology transfer to the private sector. Small firm university spin-offs have been common in these metro areas, particularly among start-ups in such emerging fields as biotechnology, nanotechnology, and computer animation. In contrast, large established firms dominate patent activity in Minneapolis-St.Paul; Rochester, New York; Austin, Texas; Cincinnati, Ohio; New London, Connecticut; Albany, New York; and Corvallis, Oregon.[xxi]

2.5 The Importance of Small Firms

What makes the large firm/small firm issue so important is that recent research suggests that small firms and particularly new startups have been responsible for a significant amount of net job growth in the United States going back at least to the 1970s. Both large and small firms are continuously and simultaneously destroying and creating jobs, but in this ongoing "creative destruction" new firm births are responsible for net job growth while existing firms, on average, are responsible for net job loss. The "deaths" of existing firms accounts for most of the job loss in the country. According to research conducted by the Kauffman Foundation, about 3 million jobs were created by new startups each year between 1977 and 2005 regardless of the state of the economy.[xxii] But among existing firms during this period, there were only nine years when there was net job creation and in the recessions of 1980-81, 1991-92, and 2001-2002, job losses were as high as 5 million per year. As the foundation concluded, "startups aren't everything when it comes to job creation. They're the only thing."[xxiii] They create new jobs at birth and the survivors create even more. The downside is that the survivors, on average, produce a net loss of about 1 million jobs per year as a result of survivor deaths.[xxiv] In technical terms, "patterns of job growth at startups and existing firms are both pro-cyclical, although existing firms have much more cyclical variance."[xxv]

The implication, as the Kauffman study suggests, is that states and cities with job creation policies aimed at luring larger, older employers can't help but fail, not just because they are zero-sum, but because they are not based in realistic models of employment growth. Job growth is driven, essentially entirely, by startup firms that develop organically. In terms of the life cycle of job growth, policymakers should appreciate the astoundingly large effect of job creation in the first year of a firm's life.[xxvi]

In this case, effective economic development policy must include a "central consideration of startup firms."[xxvii] How cities can promote such a policy is the big question.

2.6 Avoiding the Dangers of Innovation-based Development

Harvard University economist Edward Glaeser suggests that "entrepreneurship predicts urban success," but asks "Can City Hall create a district that attracts more entrepreneurs" to a city?[xxviii] In considering the City of Boston's plan for a South Boston waterfront innovation district, Glaeser asserts that "while governments have a poor track record of micro-managing innovation, they can help eliminate the barriers to entrepreneurship, like excessive regulation and a dearth of affordable, attractive living and work space."[xxix] What cities have to do in planning innovation districts is avoid what Glaeser calls four great dangers.

- *Impatience is the first danger*. There are constant temptations to make compromises, locking in projects that could damage the long-run success of the district. The district should allow constant change and upgrading.
- *Acrophobia is the second danger*. Hyper-density can help connect innovators and speed the flow of ideas. Therefore do not fear building up rather than building out.
- *Exclusivity is the third danger*. The innovation district should be start-up friendly and provide housing and work space for all kinds of entrepreneurs, rich and not-so-rich.
- *Empty sidewalks are the fourth danger*. To be successful, innovation districts must be easy to stroll and filled with ground level retail and dynamic public spaces.

Avoiding these dangers is particularly important to large, well-heeled cities like Boston, but there are lessons here for all cities and towns. Do not focus on a single industry or single sector. Telecom City was an attempt in the late 1990s by the cities of Malden, Medford, and Everett to create a 200 acre innovation zone exclusively for firms in the telecommunications industry.[xxx] After years of unsuccessful attempts at attracting telecommunications companies, the three cities changed the purpose and name of the district to River's Edge to downplay telecommunications and to encourage a range of employers to set up shop in the district, adding housing, and park land.[xxxi] Today, the district houses a number of small technology companies and a regional corporate headquarters for the Marriott hotel chain.[xxxii]

Similarly, while older industrial cities often have a good deal of abandoned real estate that needs redevelopment, successful innovation districts concentrate industrial space, research facilities, housing, cultural amenities, and park land in small areas of the city in order to create a sense of vibrancy and 24-hour live/work space. These neighborhoods can be the seed that leads to further development outside the core of the original innovation district.

Innovators and entrepreneurs do not generally strike it rich when they begin their operations. It is therefore important that space remain affordable within the innovation district for both business and housing and as the district matures, it will be important to continue to set aside space within the district that remains affordable even as certain sections gentrify. This allows a constant stream of new innovators and entrepreneurs to set up operations, constantly refreshing the district.

Finally, retail space and green space within the district is vital for attracting firms and young workers. To attract state-of-the-art industry, it is necessary for the district to have good old-fashioned commercial

space, restaurants, pubs, and places for cultural events. This is a far cry from the older version of industrial parks where land was set aside exclusively for industrial uses.

2.7 Urban Policy to Encourage New Firm Development

The *Governor's Guide to Cluster-Based Economic Development* provides a set of lessons for cities (and states) to follow in establishing industrial and innovation clusters.[xxxiii] Here is a list of the key recommendations in the Guide:

- The city must encourage networking and networks by establishing a collaborative structure among small and middle-sized enterprises
- Efforts must be made to train a specialized workforce for the firms in the innovation district and consideration should be given to establishing a cluster skills center within a local vocational school or community college
- The city should form cross-agency quick response teams to coordinate and customize services for firms in the innovation cluster
- Efforts should be made to build in incentives for multi-firm applications for national and state funding programs
- Where possible, local and state government should invest in cluster R&D (as in the case of the Massachusetts Life Sciences Center)
- Efforts should be made to market clusters regionally, nationally, and ultimately internationally working with state government agencies

2.8 Lessons for the City of Holyoke

With the knowledge we have gained about clusters, industrial districts, and innovation districts, there appear to be some important lessons for the City of Holyoke. We can summarize these lessons in terms of three major categories: (1) Type of industry cluster (2) Type of industrial district (3) Role of innovation in economic development.

2.8.1 Type of Industry Cluster

It makes sense for a city like Cambridge, Massachusetts to develop a cluster of firms around computer technology, information processing, and biotechnology. With the extensive array of university laboratories specializing in these fields at Harvard and MIT (and nearby at Northeastern), it is natural for companies to establish operations in Cambridge to take advantage of the research and talent housed in these institutions.

While there are university and college campuses in the Pioneer Valley including UMass Amherst, it is unlikely that these will provide the same kind of environment for high tech firms as a Cambridge, Silicon Valley, the Research Triangle in North Carolina, or even Austin, Texas. The new Massachusetts Green High Performance Computing Center (MGHPCC) may attract a few start-ups, but since the power of the center can be accessed by laboratories and firms far from Holyoke, there is no particular reason for a firm to establish operations in Holyoke simply to take advantage of the center.

The "cluster" that Holyoke might attract includes a range of manufacturing firms that rely heavily on electric power. Holyoke's relatively cheap and clean hydroelectric power remains one of the city's true assets. Instead of focusing attention on one sector, Holyoke should be casting its net to attract virtually any manufacturer that seeks a relatively cheap source of electricity. The city should heed the lesson of Telecom City and not try to attract a single industry.

2.8.2 Type of Industrial District

Moreover, the City should follow the Marshallian District model. Instead of trying to snare a large anchor institution to settle in the city, it should spend its effort creating a district where a large number of small start-up firms can take advantage of relatively cheap energy, easy permitting, inexpensive real estate and housing, and a neighborhood with a dense set of cultural and recreational amenities. Hence, the focus should be on creating a small geographically-based industrial district where a large number of small firms can cluster. Density is important to provide agglomeration economies for the firms and safe, exciting neighborhoods for their owners and workers.

While it is not possible in the short term to resurrect all of the abandoned buildings in the city, it makes sense for the city to designate a particular neighborhood for new development and concentrate what resources it has available to "clean up" this neighborhood and make it available as an industrial or innovation district. This district could be declared an "Urban Overlay District" where zoning, permitting, renewed infrastructure, new or rehabilitated housing, and crime prevention are all concentrated. Essentially the city needs to practice triage, building a concentrated innovation district within a neighborhood that is not so well off as to need little improvement or so bad off as to be a daunting challenge. Building the district in the vicinity of the MGHPCC might make sense since this area of the city should already be well-positioned in terms of the attributes of an urban overlay district.

2.8.3 Role of Innovation in Economic Development

Instead of focusing on one or two leading edge technologies, Holyoke should attempt to attract an array of small startups that rely on a broad array of innovative research and development. To assure that these firms have an appropriately trained workforce once they are ready to expand, the city should work closely with Holyoke Community College to link firms with the college and to help guide the curriculum of the school to meet the labor force needs of firms prepared to set up operations in the city. The HCC should be brought in as a full development partner with the city, very much the way community colleges are used in North Carolina. The presidents of local community colleges in North Carolina cities and towns are often the first persons from the community who meet with a prospective business firm, inquiring of the firm's managers how they can help to train the workforce they will need when they begin their operations.

Holyoke might also make overtures to UMass Amherst to see whether there are spin offs from university laboratories that are looking for inexpensive places to establish operations. By keeping in continuous contact with the university, the city can learn of new potential firms even before they are ready to startup as businesses. The early bird, in this case, may get the worm.

2.9 Conclusions

The combination of heeding the lessons learned in the EDSAT process plus an understanding of the benefits from pursuing a Marshallian small business industrial district approach to "reindustrializing" should be considered as a basis for new economic development efforts in Holyoke.

Focusing on small scale energy-intensive manufacturing and associated service industries including new startups, working continuously to make Holyoke "business-friendly" in terms of permitting and regulation, concentrating development at first within a relatively small urban overlay district within the city, working closely with Holyoke Community College as a development partner, and marketing Holyoke as a city with reasonably priced housing and commercial property are some of the lessons we have drawn from this analysis. The road ahead is not an easy one for cities like Holyoke, but with an improving national and statewide economy, Holyoke should be able to compete for its fair share of business investment and jobs.

3. BEST PRACTICES FOR REGIONAL ECONOMIC DEVELOPMENT AND CATALYST PROJECTS[7]

Five case study overviews have been developed in response to interest in evaluating the MGHPCC as a "catalyst" event, Holyoke's position in a larger regional economy, and leadership assumptions about what to position as the right assets for growth. These case overviews include:

- East Baltimore, Maryland
- Brantford, Ontario, Canada
- London Docklands/Canary Wharf, UK
- Innovista, Columbia, South Carolina
- Pittsburgh, Pennsylvania

Each case received significant endorsements and resources from anchor firms, governments and/or employers. Consequently, it is important to compare the impact of passionate visions for economic development versus making the right strategic assumptions for the future. Claiming the existence of an economic catalyst without honest connections to the regional economy and the needs of target companies has serious limitations and many disappointments.

Cases show success when:

- A catalyst event is evaluated in the context of nearby commercial and industrial activities, transportation systems and intellectual infrastructure;
- There is proof of access to markets, amenities and employment / It is part of a system and not isolated, disconnected real estate;
- The project's identity is closely linked with the greater economy, city or region / It is part of a whole and the whole is tangibly better because of the part;
- Signature investments that represent the aspirations of the project are clearly stated;
- The return on investment for employers and companies is connected with productivity and competitiveness rather than buying into an aspiration for redevelopment;
- Project leaders flex with changes in economic conditions and focus on every investor decision to locate and create jobs, no matter what scale;
- Higher education sees the district as a potential asset but is allowed to explore a wide range of engagements and investments based on its own mission and interests;
- The identity of the district is inserted into the language of municipal, regional, state and national leaders; and marketed as a part of the "DNA";
- Signature enterprises in promising industries that are located near or in a district are studied carefully for potential expansion, positive impacts on supply chains, and meaningful connections with their own competitive requirements;
- The district is treated and measured as one, large, diverse business incubator;
- The district and its strategic identity are literally on the regional and municipal map as a destination;

[7] Research and writing of this section was led by Fairfield Index, Inc.

- Policy makers at the local, regional, state and national level invest in infrastructure growth that sustains the district's economic agenda;
- Intercity access is clear and honest; and
- The regional agenda is well-coordinated and markets the district's assets.

Cases tend to lag or fail when:

- Districts are treated as stand-alone, independent markets;
- Industries and entrepreneurial investments are targeted without considering nearby competition;
- Marketing does not move off of theory and concept;
- Too much attention is paid to physical assets instead of job creation / The goals of building and rehabilitation of facilities is disconnected from the employers' needs;
- Marketing suggests stand-alone, independent choice rather than integration with larger economy;
- Economic legacy, such as manufacturing, is not tied to current inventories of active companies;
- Concepts and regulatory regimes are inflexible in the face of economic change;
- Physical access to the district is difficult and hard to understand;
- Signature enterprises in promising industries that are located near or in a district are viewed as easy expansion or supply chain targets for the district;
- Calls for and investment in re-development and residential infrastructure are viewed as magnets for employers;
- Higher education is assumed or told to play a specific role or make a specific investment;
- Business incubators are established without discipline or focus;
- Targets industries are claimed with no commitment to customer service; and
- Commitments to green or clean business are vague and/or immeasurable.

These successes and failures are all applicable to the Holyoke Innovation District, and Holyoke has an opportunity to leap over some of the missteps of these peer communities by:

- Communicating clearly about current and future access to amenities and supply chains in the Pioneer Valley, proximity to North American markets, and breakthroughs and capital plans for passenger rail;
- Mapping and communicating every investment and every participant in the entrepreneurial ecosystem in the District;
- Helping signature enterprises that are located near the District explore realistic market opportunities;
- Encouraging higher education to be partners in exploring linkage to the District rather than setting expectations for specific investments or presence;
- Helping distinguish the Pioneer Valley as a destination for green enterprises, a center of expertise on development of clean industries and a place, especially in the District, where companies can measure their own renewable portfolio; and
- Expressing and maintaining an honest, in-depth inventory of current target industry companies in the District and region (manufacturing and data technology firms).

3.1 East Baltimore

3.1.1 History

The following are the economic conditions occurring in East Baltimore before its catalyst event.

Baltimore had a very strong steel industry in the beginning of the 20th century. As manufacturing declined nationwide, Baltimore was hit very hard. The city lost 100,000 manufacturing jobs between 1950 and 1995. Its population declined by a third during the same time period. Today, only six percent of current jobs are in manufacturing and the vast majority of current jobs are in the low-skilled (and low-wage) service sector.[8]

One of the hardest hit areas of East Baltimore is called the "Middle East" neighborhood, located immediately to the north of the Johns Hopkins Medical Institute. It is one of Baltimore's toughest neighborhoods, and has suffered from the cycle of gang violence and crime that has devastated the rest of East Baltimore. According to the 2000 census, it is Baltimore's second poorest neighborhood, with a median household income of $14,900. Based on 2000 data, its residential vacancy rate is five times the city average. Several smaller-scale scattered redevelopment efforts have been attempted in the past without success.[9] Table 1 below presents demographic information for the Baltimore area at the time.

Table 1: Baltimore Area Population and Households (2000)

Population	
East Baltimore Development Inc. (EBDI) redevelopment area	3,750
East Baltimore	243,778
Baltimore City	637,455
Percent of Population that is African American	
EBDI redevelopment area	96%
East Baltimore	62%
Baltimore City	63%
Number of Households	
EBDI	1,920

[8] http://2700block.blogspot.com/2006/08/brief-economic-history-of-modern_17.html
[9] "The East Baltimore Revitalization Initiative: A Case study of Responsible Redevelopment." The Anne E. Casey Foundation, 2010.

East Baltimore	95,790
Baltimore City	233,013

Observations:

- 37 percent of residents make less than $10,000 per year (2000).
- 43 percent of area residents have not completed high school compared to 25 percent of Baltimore City households; 38 percent of residents have only completed high school.
- Only 48 percent of EBDI redevelopment area residents over the age of 16 are working compared to 60 percent of city residents.
- Many residents face barriers to employment such as criminal background (11 percent in redevelopment area and 72 percent in East Baltimore) or a disability (12 percent in redevelopment area and seven percent in East Baltimore).
- Additional barriers include substance abuse and a lack of work history.
- The Jacob France Institute report claims that there is a fundamental disconnect between local residents' skills and work anticipated at the biotech park. Fifty-five percent of the jobs that will be created will require at least an Associates degree. [10]

3.1.2 The Catalyst Event & Expectations

In 2001, then-mayor Martin O'Malley announced the East Baltimore Revitalization Initiative to undertake a $1 billion project to create an 88-acre community with biotechnology and life sciences research facilities, retail facilities, and market-rate housing. The project would involve acquiring and demolishing residences, and relocating hundreds of residents.[11]

The catalytic event was to be the development of the Science and Technology Park at Johns Hopkins. It opened its first building in the Spring of 2008. Parallel with this project were the developments of a new school, new residential units, and a workforce development program. This project was expected to completely revitalize the Middle East neighborhood of east Baltimore and, to most crucially, create jobs.

They estimated 72 jobs would be created to manage the property, and 84 jobs would be created in the social services and educational programs being developed. The majority of the property management jobs will be low or unskilled jobs, and the majority of the jobs in the social services and education programs will be high skilled.[12] EBDI also has a workforce placement program in place that specifically focuses on the Johns Hopkins Medical Institute and a few other local sites as targets for employment of area residents. Participants in the EBDI workforce program specify interest in construction, environmental services, healthcare and hospitality.

Since the initiative began, there have been numerous articles in the media about the challenges this project has faced due to both the recession and competition from Maryland's other biotech corridor in

[10] Clinch, Richard. "The Workforce Supply and Demand Characteristics of the East Baltimore Development Inc. Redevelopment Effort" Jacob France Institute. June 2009.
[11] Anne E. Casey Foundation.
[12] Clinch, 10.

Montgomery County. Hopkins may have provided the project with a signature brand in a target industry, but life science firms were clustering a matter of miles on the other side of the Washington, D.C. Beltway.

3.1.3 Leadership & Current State

East Baltimore Development Inc. is the non-profit organization that is leading the revitalization of the area north of Johns Hopkins medical campus. They are partners with the U.S. government, the State of Maryland, Baltimore City, the Annie E. Casey Foundation, Johns Hopkins University (JHI), and the Harry and Jeannette Weinberg Foundation.[13] In 2004, EBDI chose the developer Forest City (technically a "Forest-City led partnership" known as the "Forest City-New East Baltimore Partnership") to lead the development of the commercial end of the project.[14]

Eighty percent of the eventual $1.8 billion cost was to come from the private developer. Baltimore city was to contribute $62 million, the state, $42 million, and $37 million of federal funds.[15]

As of early 2009, the developer, Forest City, had $47 million equity invested in the project, and the city, state and philanthropic organizations had invested another $120 million. Despite the recession leading to disappointing results for the biotech park, the developer maintains that partners are committed to the project even if that means it will be less biotech-focused than originally envisioned, and a longer time frame for revitalization

As of August of this year, plans for Forest City have generated significant scrutiny from area residents who feel disenfranchised from the process and fear that they will be priced out of their neighborhood.[16] Issues of Section 8 vouchers have been on the table as well as funding sources. The plans for Forest City seem to be in limbo and no mention of an upcoming meeting to address the public's concern has been scheduled.

3.1.4 Green Tech & the Future

The project plan calls for creating 2,200 "new and rehabilitated green homes and apartments." Leadership wants to turn "vacant, derelict…(and)…in some cases lead-contaminated properties into sustainable, energy efficient home ownership opportunities."[17] One third of this housing will be designated for low-income families, another third for moderate-income families, and the last third will be offered at market-rate.[18]

EBDI is clearly the point-organization on this project, but with heavy involvement from city, state, and federal partners. Local community members feel bypassed in this project, as though this is a development that is being forced upon them.[19] [20] Senior Vice President of Forest City-New East Baltimore Partnership, Scott Levitan, was shut out of a public meeting in July of 2011 because he failed to make copies of the plan

[13] http://www.ebdi.org/about
[14] http://www.forestcityscience.net/hopkins/sciencepark_history.shtml
[15] Aerts, Jon. "East Baltimore Biotech Park remains in Limbo after 10 years." http://www.corridorinc.com/corridor-news-mainmenu-119/4623-east-baltimore-biotech-park-remains-in-limbo-after-10-years
[16] http://findarticles.com/p/articles/mi_qn4183/is_20110824/ai_n58080243/
[17] Duchamp.
[18] The Anne E. Casey Foundation.
[19] The Anne E. Casey Foundation.
[20] http://findarticles.com/p/articles/mi_qn4183/is_20090430/ai_n31627276/

presentation before the meeting. As of the August 2011 meeting, construction is still scheduled to start in mid-2012.[21]

The main goal of all partners was for the project to be done in a "socially and ethically responsible way." The point-organization, EBDI, aims to create jobs and positively benefit the neighborhood, by creating a "thriving mixed-income community for families, business, and public institutions."[22] The Anne E. Casey Foundation, a major partner of the EBDI on this project, evaluates the status of the project in several categories:[23]

- Physical Development
- Resident Engagement
- Relocation (how many households have been relocated, have their home values increased, resident post-relocation satisfaction)
- Family Advocacy and Supportive Services
- Mixed Income Housing
- Demolition (accomplished while mitigating health hazards as much as possible)
- Workforce Development, Asset Building, and Economic Inclusion
- Education
- Financing and Investment

3.1.5 Conclusions

Selection of a developer requires a revived commitment to transparency and community input, even if an inclusive vision for mixed use and industry has been achieved. Relying on resident or close proximity assets such as life and medical sciences without considering larger market forces and competitor communities is risky. Communities, leaders and economic developers must be given permission to revisit all pre-recession visions and plans.

3.2 Brantford

3.2.1 History

The following are the economic conditions occurring in Brantford before its catalyst event.

The end of the farm implements manufacturing industry caused serious economic problems for Brantford in the early 1980's. By 1993, unemployment was almost at 14 percent. The city has since invested heavily in infrastructure. Brantford is along a major transportation corridor in Ontario and is a little less than 1.5 hours from Toronto. The city was making significant gains in job creation at the beginning of 2000 but was then hit by the global financial crisis. Unemployment has risen from six percent in 2006 to 11.4 percent in 2010. The 2010 figure is 2.6 percent higher than the Ontario average, and 3.3 percent higher than the Canadian average. The economy had been growing due to local land sales and commercial development. The city wants to continue to focus on industrial land development but acknowledges they need to diversify.

[21] http://findarticles.com/p/articles/mi_qn4183/is_20110824/ai_n58080243/
[22] Ebdi.org
[23] The Anne E. Casey Foundation.

As shown in Table 2 below, 20 percent of Brantford residents have no certificate, diploma or degree. This is twice that of Ontario. Additionally, only 13 percent of Brantford residents have a university degree as compared to the 26 percent Ontario average. This data represents a significant talent lag in Brantford.

Table 2: Educational Attainment Brantford vs. Ontario

Educational Attainment Level	Brantford	Ontario Average
No certificate, diploma or degree	20%	10%
High School completed *	30%	25%
University Degree	13%	26%

*their highest level of attainment

Other figures also show Brantford trails the Ontario average for percentage of students studying math, engineering, and business.

Brantford's largest share of employment is in manufacturing, 23 percent of the workforce as compared to Ontario's 14 percent. The next largest share is in "other services." Brantford trails Ontario significantly in business services, financial services, and real estate as areas of employment.

Brantford's current key industries are:

- Food Manufacturing
- Manufacturing
- Plastics and Rubber Products
- Chemical Manufacturing
- Machinery Manufacturing
- Primary and Fabricated Metals
- Warehouse Distribution

3.2.2 The Catalyst Event & Expectations

The completion of the section of Highway 403 from Ancaster to Brantford in 1997 was the beginning of Brantford's turnaround. Highway 403 connects Brantford to the Greater Toronto area and to Niagara Falls.

The vast land available along highway 403 and the access to highways and border crossings make it convenient for shipments and transporting goods from the United States. Highway 403 has attracted the warehouse distribution and food manufacturing industries along with major companies such as P&G since its opening.[24] P&G's opening in 2005 has created more than 400 jobs for Brantford.[25]

[24] http://www.navona.ca/News/ArticlesE/0506Ontario.html
[25] http://www.brantfordbrant.com/KeyIndustries/WarehouseDistribution/Pages/default.aspx

Can a market re-define its competitive reputation purely on access and proximity? With a commitment to understanding the business of logistics and supply chain management and by making honest statements about exactly what markets are in striking distance, the answer for Branford is "yes."

3.2.3 Leadership & Current State

There was no economic development leader for the creation of the catalyst 403. This catalyst event was not locally led or inspired but rather it merely occurred. However, there is a lot of effort being put into building upon Brantford's current economic success by city leadership, and specifically its Department of Economic Development and Tourism. Brantford is also listed as a center for growth by the province and encouraged to undertake projects with regional partners. Brantford shares a lot of activities related to economic development with the County of Brant (they also have one shared chamber of commerce between them). However, Brantford city's economic development strategy is less clear on the exact relationship, stating that "coordinating/cooperating/resolving the discussion of land need between the two municipalities had been under discussion for a long time and that this should be brought to a head to resolve matters."

Today, Brantford's transportation connections are a big selling point to companies looking to locate in the city. The city advertises that Brantford has one day trucking access to "60% of all manufacturing establishments in North America, 70% of the Canadian population, and 48% of the American population." It is also close to major airports. The city's growth was also facilitated by legislation that protected land from industrial development. Brantford has an abundance of cheap land for development and this legislation caused companies to look for alternatives away from the Greater Toronto area.[26] [27]

Observations:

- The population in 2009 was 93,000 people, and it is forecast to grow to 120,000 people in 2031.
- The cost of living in Brantford is well below the average for Ontario.
- Median income (before tax) increased from $43,908 CAD to $63,093.

3.2.4 Green Tech & the Future

Brantford and a few neighboring cities very recently declared themselves "Ontario's green energy hub." This initiative involves reducing energy reliance on fossil fuel based energy, and creating jobs through green energy production, research and development, and manufacturing. Within this hub, there are now plans for the first wind blade manufacturing plant in the province, and a new wind tower manufacturing plant was just announced. All the steel for a wind farm in Essex will be 100 percent made in Ontario.[28]

Brantford laid out a Community Strategic plan in 2005, which planned for an Economic Development Strategy, completed in 2010. The city also developed a Municipal Cultural Plan, a Downtown Master Plan and a Waterfront Master Plan, with the overarching goal of creating economic vitality and innovation. The city's goals for economic development are listed below.

[26] http://www.navona.ca/News/ArticlesE/0506Ontario.html
[27] http://kingandbenton.com/webnews/more/A60_0_1_0_M/
[28] http://www.brantfordexpositor.ca/ArticleDisplay.aspx?e=2885754

Brantford Economic Development Guiding Principles:

- Economic Development must be seen as an investment and not simply a cost.
- Multiple strategic thrusts must be executed simultaneously, each adjusted and emphasized according to the challenges and opportunities that evolve. These include:
    - Business retention and expansion of the existing economic base.
    - Business attraction in selected targeted industries.
    - Tourism and marketing development including culture and arts.
- Make serviced commercial and industrial land available shovel ready, so the City can respond quickly to opportunities.
- Economic zones do not conform to jurisdictional borders and neither do opportunities (consider partnering across the region).
- Workforce development will be key to long-term economic viability of the city (the city must take the lead on raising skill and overall education level of the population).
- The establishment of regular Council-to-Council meetings to discuss regional economic initiatives.
- The city, through the Economic Development and Tourism Department must continue working closely with post-secondary institutions to develop programs that meet the needs of employers.
- Although the public sector creates some jobs, it's essential the economy be built upon the private sector.
- The Council must be willing to move forward and take some risk.
- Community support and participation must be sought in difficult future decisions.
- Formal and informal leaders must visibly work together to achieve common goals.

To measure success at individual project levels, during the feasibility study a "half-way" study to identify whether obstacles are insurmountable will be conducted. The city uses pre-set timelines for the project to measure success in all other arenas.

3.2.5 Conclusions

Externally-driven catalyst events, especially infrastructure catalysts like 403, are subject to wide and potentially destructive speculation regarding economic and societal impact. Communities move forward with patience and context where leaders encourage data driven decision making and ensure clear timelines for delivery and discussion of the information.

3.3 London Docklands/Canary Wharf

3.3.1 History

The following are the economic conditions occurring in the Docklands/Canary Wharf before each of its catalyst events.

Canary Wharf is located on the Isle of Dogs in London. The isle was home to thriving docks from the 19th century until the 1970s. The docks became obsolete after "containerization," which the docks could not handle. The absence of this industry created a very depressed part of London, with several areas left dilapidated and abandoned. Even after the successful development of the Canary Wharf office complex, poverty remains in the area. There exists a huge divide between the wealthiest and poorest on the isle,

with the area being home to both some of the highest incomes in the country and Blackwall, one of the poorest wards in the whole country.[29]

Between 1961 and 1971, greater London lost 500,000 jobs in manufacturing, industry, distributive trades, transport, communications, and public industry. In 1971, 48 percent of docklands jobs were manufacturing, and 25 percent were port transport. In 1981, 60 percent of the Docklands area was vacant, derelict, or under-used and there was 17.8 percent unemployment.

In the 1970s, severe unemployment and social deprivation (limited access to the social world due to low socioeconomic status, i.e. lack of opportunity, political voice, dignity) were so difficult in the Docklands that the local community declared itself an "independent republic" on March 3, 1970, declaring its own leadership. Several unsuccessful revitalization attempts were made in the 1970s, with the "London Docklands Development Corporation" (LDDC) created in 1981, ultimately being the most successful.

3.3.2 The Catalyst Event & Expectations

There were two catalytic events associated with this development. The first was the creation of the LDDC in 1981 by the Department of the Environment, and a huge commitment by the central government to regenerate the docklands area. The Isle of Dogs, West India, Milwall, and East India Docks became an "enterprise zone." New housing and office space was built, and major investments in transportation (i.e., Jubilee Line and the Docklands Light Rail) were made.

The second catalytic event was the Canary Wharf business district project. Three "City" banks proposed the Canary Wharf project in 1985 to create an alternative to locating to London's city centre. The proposal of the Canary Wharf project by the banks demonstrated to the government that the LDDC initiative was having success and would create jobs. This confidence allowed the LDDC to obtain funding for crucial transportation projects. In addition, the banks anchored the area, encouraging other investment. Canary Wharf is still the area's most dominant feature; it currently holds 14 million square feet of office and retail space, and it is the work place of 93,000 people.

The Docklands population has been declining since the beginning of the 20th century. In 1971, the population of the London Borough of Tower Hamlets (of which the Docklands are a substantial part) was 164,699. In 1981, it declined further to 139,989. The population began to rebound in the 1990s, with the population reaching 196,121 in 2001.[30]

The number of employers in the Docklands has doubled since 1981, from 1,021 to 2,690. Employment was at 27,200 in 1981, 85,000 in 1997 with a forecasted working population of 175,000 in 2014. The unemployment rate was at 17.8 percent in 1981, and declined to 7.2 percent at the end of December 1997.

[29] http://www.absoluteastronomy.com/topics/Isle_of_Dogs

[30] http://www.visionofbritain.org.uk/data_cube_page.jsp?data_theme=T_POP&data_cube=N_TOT_POP&u_id=10057346&c_id=10001043&add=N

Table 3: Structure of Docklands Employment (1997)[31]

	Employees		Employers	
	Number	Percent	Number	Percent
Agriculture, Fishing	38	0	6	0
Mining	6	0	2	0
Manufacture	15,765	19	273	10
Energy	94	0	3	0
Construction	2,083	3	112	4
Wholesale, Retail, Repair	6,956	8	474	17
Hotels, Restaurants	3,459	4	208	8
Transport, Communication	7,025	9	213	8
Finance Intermediation	17,768	22	123	5
Real Estate, Renting, Business Activities	17,206	21	641	24
Public Administration	2,873	3	35	1
Education	1,744	2	78	3
Health, Social Work	1,986	2	149	6
Community, Service Activities	4,709	6	206	8
Others	4	0	1	0
Unclassified	584	1	166	6
Totals	82,300	100	2,690	100

There were several initial objectives for the project:

- Improve the image of Docklands, particularly developing confidence that there would be continued improvement in the area;
- Use financial resources to attract private investment;
- Acquire as much public sector land resources as possible -- "In order to undertake the necessary reclamation, servicing and site assembly, followed by remarketing to the private sector wherever such sites were not the subject of suitable redevelopment plans by their current owners;
- Improve public transport;[32]
- Work to indirectly improve the quality of local housing and amenities; and
- Revive Docklands economy.[33]

With respect to transportation, the Jubilee Line extension through Canary Wharf to Stratford began construction in 1993 and was opened in 1999. The Docklands Light Rail (DLR) construction began in 1990 and service in 1994.[34] LDDC was able to obtain government funding for the transportation projects when the Canary Wharf project became a possibility, after three banks expressed interest in office space in the area as an alternative to the expensive and limited office space choices in London's city centre. The

[31] http://www.lddc-history.org.uk/regenstat/index.html
[32] * The importance of improving the transportation connection to the Isle was recognized even before the creation of the LDDC as essential to regeneration.
[33] http://www.lddc-history.org.uk/beforelddc/index.html
[34] http://www.royaldockstrust.org.uk/rdhist.htm#Infrastructure

development of Canary Wharf changed the job creation predictions in the area from 12,000 to 50,000.[35] Overall, about half of the LDDC's £1.86 billion was spent on transportation infrastructure.

Canary Wharf is a unique case because the control of development in the Canary Wharf region of London originated through a large governmental economic development initiative. Today, the private developer, "The Canary Wharf Group" is probably the most influential player in the area (and in the city it has developed more office space in the last ten years than the rest of London).

Local activist groups and politicians thoroughly scrutinized the LDDC's work in job creation and workforce training. The LDDC was, however, formally accountable to the House of Commons Employment Committee and in Spring 1988, its officers were summoned to a hearing in order to judge the LDDC's progress. The committee examined what progress had been made, what ideas for job creation the officers had, and what disconnect might exist between skill sets of residents and the jobs being created. There was no specific mention of job creation in the original Department of Environment remit for the LDDC, but it acknowledged that the success of the project was contingent upon not just physical regeneration but the regeneration of the community, which would necessarily include economic improvement. They altered the remit to include a more precise definition for community regeneration that included job creation.[36]

3.3.3 Leadership

The revitalization was led by the London Docklands Development Corporation, which was established in 1981 by the national government. The Secretary of State of the Environment designated the LDDC the managing body of the Docklands Urban Development Area.

The LDDC was given unprecedented authority in key areas:

- Financial resources provided by the Treasury through the Department of the Environment, initially $60-70 million GBP per annum;
- Powers as a single development control Planning Authority (all interested investors and developers wanting information or planning permission were directed here);
- Land acquisition powers (including special assistance from Parliament);
- Powers as an Enterprise Zone Authority responsible for the Isle of Dogs Enterprise Zone, which was designated in April 1982 for 10 years; and
- Marketing and Promoting powers for the Docklands.

Local authorities, however, retained "plan making powers."[37]

There was a lot of tension between the LDDC, local organizations and leaders at the beginning of the project in the early 1980s. Tensions eased at the end of the decade and into the 1990s, however, and relations were good. Several joint infrastructure investment projects (primarily funded by LDDC) were completed by local organizations and LDDC and received positively. In addition, LDDC board members who were also community leaders were able to help ease tensions.

[35] http://www.lddc-history.org.uk/transport/tranmon2.html#Era.
[36] http://www.lddc-history.org.uk/employment/index.html
[37] http://www.lddc-history.org.uk/beforelddc/index.html

3.3.4 Green Tech & the Future

Post-1980 development, led by LDDC until its demise in 1998 and then by the boroughs, has been criticized for eating up open spaces, lack of green transport and pedestrian friendly spaces.[38] There is currently press around individual projects (commercial and housing) being "green" projects; however, there is no indication that this was a priority during the core periods of development of this area.

The Docklands area has changed radically since the LDDC began its revitalization project. The Canary Wharf project and significant infrastructure investments made a significant impact on the economic situation in the area. The area has become a much more attractive location of residence for higher-income residents, but there are sometimes tensions between the new wealth from the banking industry and the poorer populations who have lived in the Docklands for much longer.

There are still several under-construction buildings in the Canary Wharf complex, and many more have been approved to be built in the future. This means the area will continue to change as the banking industry brings more wealth to the area. Construction began on a railway station in Canary Wharf in 2009, and it is expected to be finished in 2017, making it even easier to commute to the jobs in the Docklands.

The Canary Wharf group has many small initiatives in place to keep the wharf "green." They have their own "Environmental Management System" which aims to minimize negative impacts on the environment by Canary Wharf. The Canary Wharf Group also supports the use of green energy through a "Green Tariff" with their energy company. They are constantly monitoring their energy use and looking for ways to improve. For example, at lease termination, all facilities are fitted with LED lights. They also routinely encourage staff to adopt energy-efficient practices. Canary Wharf Waste Management works to improve recycling and waste management. Primarily, they aim to reduce waste, and avoid sending waste to landfill. As of 2009, 100 percent of waste is diverted from landfill. The Group encourages the use of public transportation and alternative modes of transport as well. There are 2,200 cycling parking spaces as well as charging points and reduced parking rates for electric vehicles.

The seemingly small initiatives demonstrate the group's commitment to being a "green environment" and they have been widely recognized for their efforts. For example in 2010, they were ranked by the Sunday *Times* as one of the best green companies to work for in 2010. This ranking identifies that their efforts are attracting talent to the group, as well as new companies to the Canary Wharf area.

3.3.5 Conclusions

This shows that granting authority and power in exerting a community's competitive muscle and developing infrastructure is possible. Expectations and funding derived from overarching jurisdictions such as the national investment into the Docklands area, does not necessarily lead to "cookie cutter" or dictated solutions if leadership is aligned, local to nation (or in the case of Holyoke, municipality to state). The LDDC was given unprecedented authority but its network of leadership was horizontal through the community and greater London, vertically to the national government, and was aligned, accountable and enthusiastic about achieving very tough goals.

[38] http://www.absoluteastronomy.com/topics/Isle_of_Dogs

3.4 Columbia, South Carolina "Innovista" – Background

Throughout the 1990s, the downtown area to the west of the University of South Carolina campus was full of undeveloped parking lots, and "low density industrial and commercial uses." The development of new highways, like 77, at the end of the 20th century shifted growth towards Lake Murray and Fort Jackson, and away from the city centre. Recently, however, there have been rejuvenation efforts in the city center focusing on reusing the old textile mills that were a crucial part of the city's economy in the 19th century and early 20th. The mills are being renovated into housing and arts and entertainment spaces. The Columbia waterfront has also been redone in the model of other successful waterfronts across the country, and planners involved in that project expect it will be very beneficial for the city.[39]

3.4.1 Event & Expectations

The catalyst event for Columbia is the ongoing Innovista project. Innovista is going to be a mixed-use urban neighborhood offering a lifestyle to attract the "best and brightest" to work and live in downtown Columbia. The University and state government have invested in research centers of excellence at Innovista. The planners intended for Innovista to create thousands of research and technology jobs. At the project' s unveiling, the developer estimated that it would have a $430 million annual economic impact. However, due to the economic downtown, most of the planned buildings have not been completed because of lack of funds.

As of 2009, the Arnold School of Public Health was the only occupant, and some companies who had initially planned relocations had backed out.[40] In 2009, the original developers were fired and the original director resigned after several "damaging" articles were run about him in local papers. The new director sets a much less ambitious tone. He has highlighted the launch of the SCRA Innovation Center and the high-tech start-up SysEDA as recent victories of the Innovista project. It is likely to continue to suffer from lack of funding.[41] Despite a lot of recent criticism and financial difficulties, politicians continue to believe in the project and fund it.[42], [43]

The master-plan for Innovista estimated that the project would create 14,362 jobs and $387.5 million in retail sales annually when completed. The planners also initially concluded that "Innovista area could support 71 percent of the master plan's total development potential over the next 15 years.[44] The "South Carolina Research Centers of Economic Excellence Act" is funding research at three universities in South Carolina to stimulate economic growth. The core of this program is 13 Research Centers of Excellence with promised $51 million in funding.

[39] "Innovista Master Plan: Preliminary Report" Prepared by Sasaki Associates, Inc. July 2007.
[40] http://www.scpolicycouncil.com/research-and-publications-/fact-sheets/626-innovista-state-driven-economy-struggling-despite-140-million-in-taxpayer-support/
[41] http://www.free-times.com/index.php?cat=1992912064025693&ShowArticle_ID=11010401110699096
[42] http://www.midlandsconnect.com/news/photos.aspx?list=195148&id=412580
[43] http://www.scpolicycouncil.com/research-and-publications-/jobs/767-innovista-a-public-private-partnership-thats-all-public
[44] "Innovista Master Plan: Preliminary Report" Prepared by Sasaki Associates, Inc. July 2007.

3.4.2 Leadership

Innovista is a Public/Private Partnership among:

- Several departments of the University of South Carolina:
    a. Office of Research and Economic Development
    b. Research Foundation
    c. University of South Carolina Columbia Indicator
    d. Intellectual Property Office
- Businesses:
    e. Chernoff Newman
    f. John Lumpkin Jr. Sasaki Associates
- Government partners:
    g. State of South Carolina
    h. City of Columbia
    i. South Carolina Department of Commerce
    j. Richland County
    k. South Carolina Centers of Economic Excellence
    l. S.C. Coordinating Council for Economic Development[45]

3.4.3 Green Tech & the Future

Innovista plans to be a leader in sustainable development. All Innovista buildings will be LEED certified, and the development will be pedestrian and bicyclist friendly. Visitors will be encouraged to walk or take the shuttle around Innovista.[46]

The initiative has struggled greatly as a result of the economy and difficulties with key players. Two developers have been fired, and the first director resigned. The new director, Don Herriott, has changed the focus of the initiative. He says earlier efforts were focused too strongly on the physical aspects of Innovista, and not enough on job creation. He stresses that Innovista is more than its campus and should extend beyond that. He told the State Newspaper, "We overhyped the building aspect, and we overhyped the hydrogen economy as being Innovista. The 'build-it-and-they-will-come' didn't work. And you don't bet on a technology; you bet on a system." He says now Innovista will emphasize that it is a system for connecting business with university researchers rather than a physical, confined district of labs, offices, and retail.[47] Currently, Innovista is facilitating the development of an IT hub in Columbia. The building (Wilbur Smith Building in downtown Columbia) is not one of the "Innovista buildings." However, it is included in the Innovista project now, and the Innovista leadership is helping to recruit companies, provide information to interested companies, and facilitate interaction between the new companies, the landlord and current tenants.

Mr. Herriott has said he intends Innovista to be an "Ecosystem" for Innovation. This plan was recently helped along by the opening of the 2nd of three innovation centers in the state, which were funded and authorized five years ago by the State legislature. He hopes that companies will develop out of the USC-Columbia Technology Incubator, and set up permanent roots in Columbia as they find success.[48] The

[45] http://innovista.sc.edu/about/partnership.aspx
[46] http://innovista.sc.edu/about/environmental.aspx
[47] http://www.thestate.com/2010/04/28/1262646/innovista-to-focus-on-pairing.html
[48] http://www.midlandsbiz.com/news/conversations/843/

Incubator has been a joint project of the city and the USC for many years, but now has a new home within the Innovista complex.[49]

3.4.4 Conclusions

A distressed urban market or corridor only blossoms when the greater economy embraces and markets its value. The Innovista considered in isolation relative to metropolitan Columbia and the Midlands of South Carolina has no advocates, no transit and no identity. The University's research and start-up agenda will be stronger because of the Innovista, and Columbia is more vibrant because of access to this emerging market of lifestyle, work and entertainment. Promises made prior to the Great Recession must be broken and reassessed.

3.5 Pittsburgh, PA – Background

Deindustrialization was extremely painful for Pittsburgh, whose economy was driven by the steel industry. A development plan was created in the 1980s that invested money in the universities for technology research. The biotech industry and computer software industries thrived as a result of this research. Today, health and education are also very successful sectors in Pittsburgh.

Less than a decade ago, efforts were still focused on fighting the decline more than opening the doors for new industries. Pittsburgh benefited from being able to shift away from steel and restructure while the U.S. economy was strong. Laid off workers were able to move elsewhere to find jobs, resulting in a smaller unemployed population.[50]

Between 1980 and 1986, Pittsburgh lost 42.6 percent of its manufacturing employment (115,500 jobs) and half of this loss was in the steel industry alone. The mayor initiated a redevelopment effort, Renaissance II (1977-1987), which was quite successful in revitalizing the city. During this time, community-based organizations received more recognition in the city. They were included in the budgeting process and were used as intermediaries between the government and the neighborhoods."[51]

Table 4: Pittsburgh Area Population

	1980	1990	2000
Pittsburgh Metropolitan Area Population[52]	2,219,000	2,394,811	2,358,695
Pittsburgh City Population	423,959	369,879	334,563

[49] http://innovista.sc.edu/map/noflash/detail.aspx?poi=66
[50] http://www.nytimes.com/2009/01/08/business/economy/08collapse.html?pagewanted=2
[51] Detrick, Sabina. "The Post-Industrial revitalization of Pittsburgh: myths and evidence." In Community Development Journal. Vol 34. No.1 Jan. 1999
[52] http://www.city-data.com/us-cities/The-Northeast/Pittsburgh-Population-Profile.html

Table 8: City of Pittsburgh Population by Race (2000)

Category	Population	Percent of Total
One race	329,000	98.4%
Two or more races	5403	1.6%
Those of One Race		
White	226,000	67.6%
Black/African American	90,750	27.1%
Amer. Indian/Alaska Nat.	621	0.2%
Asian	9195	2.7%
Hawaiian/Pacific Isl.	111	0.0%
Other	2218	0.7%

Table 9: City of Pittsburgh Population by Educational Attainment (aged 25+ years) (2000)

Category	Population	Percent of Total
Population, 25+ years	219,000	100.0%
Less than 9th grade	10,046	4.6%
9th to 12th, no diploma	30,936	14.1%
High school graduate	71,657	32.7%
Some college, no degree	35,497	16.2%
Associate degree	13,410	6.1%
Bachelor degree	29,936	13.7%
Graduate or prof. degree	27,331	12.5%
High School or more	178,000	81.3%
Bachelor degree or more	57,267	26.2%

Table 10: City of Pittsburgh Household Income (1999)

Income Category	Population	Percent of Total Population
Less than $10,000	25,927	18.0%
$10,000-$14,999	13,668	9.5%
$15,000-$24,999	24,606	17.1%
$25,000-$34,999	19,228	13,4%
$35,000-$49,999	21,441	14.9%
$50,000-$74,999	20,482	14.2%
$75,000-$99,999	8,366	5.8%
$100,000-$149,999	5,843	4.1%
$150,000-199,999	1,797	1.3%
$200,000 or more	2,394	1.7%

The unemployment rate in the city in 2000 was 5.9 percent. The percent of the population in the labor force in the City of Pittsburgh was 58.5 percent in 2000.

From 1986 to 1995, business services increased 3.8 percent in Pittsburgh compared to 11.5 percent nationally. Health services increased 50.8 percent in Pittsburgh and 60.6 percent nationally. Educational Services increased 41.4 percent in Pittsburgh and 28.8 percent nationally. A shift to the services sector from higher-skilled manufacturing jobs negatively affected wages. A partnership among the city, the Alleghany Conference, universities, and non-profit economic development organizations focused on job creation through workforce development, tourism, and high technology. [53] Currently, the biggest industries in Pittsburgh are health services, education, social services, and research.[54]

3.5.1 The Catalyst Event & Expectations

The catalysts were a series of economic development initiatives. Most significantly, Renaissance II (1977-1987), and Strategy 21 (Strategy 21: Pittsburgh/Allegheny Economic Development Strategy to Begin the 21st Century). Renaissance II invested in building high-rise office complexes, a convention centre, cultural institutions; improving transportation, historic preservation and community development. The goal was to restructure the economy around high technology, research and development, advanced services and entrepreneurship. In 1985 and through Strategy 21, universities partnered with the Allegheny Conference, its business, local and state government in order to secure state funds for economic development. Strategy 21 made investments in infrastructure development, including a new airport and highways. They also advanced technology research, and invested in riverfront development and cultural institutions. The Working Together Partnership, which was a partnership between the Allegheny Conference, the universities, and economic development and nonprofit organizations,[55] had a stated goal of creating 100,000 new jobs by 2000 through workforce development, tourism, and high technology.[56]

3.5.2 Leadership

Renaissance II: Allegeny Conference, City of Pittsburgh, state government, foundations, and nonprofits. Strategy 21 (1985) was led by the Allegheny Conference, city and county government, state government and universities. As described previously, the Working Together Partnership was a partnership amongst the Allegheny Conference, the universities, and economic development and nonprofit organizations.[57] Carnegie Mellon leads research initiatives in Computer Software, and the University of Pittsburgh focuses on biotechnology.

3.5.3 Green Tech & the Future

Pittsburgh is considered a leading "green city." The director of Renaissance II was a sustainable urban design advocate before the term even existed.[58] Pittsburgh has the fifth highest number of LEED certified buildings in the country. Initially, the green movement was led by foundations, such as the Heinz

[53] Detrick, Sabina. "The Post-Industrial revitalization of Pittsburgh: myths and evidence." In Community Development Journal. Vol 34. No.1 Jan. 1999
[54] http://www.city-data.com/us-cities/The-Northeast/Pittsburgh-Economy.html
[55] Detrick, Sabina. "The Post-Industrial revitalization of Pittsburgh: myths and evidence." In Community Development Journal. Vol 34. No.1 Jan. 1999
[56] Detrick, Sabina. "The Post-Industrial revitalization of Pittsburgh: myths and evidence." In Community Development Journal. Vol 34. No.1 Jan. 1999
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[58] http://www.post-gazette.com/pg/07057/765098-53.stm

Foundation. However, now city officials are actively encouraging green building as well. In 2008, the city created the "Mayor's Green Initiative Trust Fund." A significant portion of this fund will help launch a Green Council that will oversee a five-year plan of green initiatives in the city. The city also expects to create 76,000 jobs in the renewable energy sector over the next five years. It has already succeeded in attracting a wind power company to the city, as well as two solar power manufacturing companies.[59]

3.5.4 Conclusions

Regionalism matters. The Renaissance movement and the formation of the Allegheny Conference are mutually dependent. The Allegheny Conference is committed to tangible impacts, jobs and infrastructure and uses Pittsburgh's economic initiatives as evidence that their region follows-through, focuses on the employer, and effectively targets the industries of the future.

[59] http://www.ucsusa.org/global_warming/solutions/big_picture_solutions/reinventing-pittsburgh.html

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[iii] Ibid.

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[vi] Ibid.

[vii] Ibid, p. 10

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[ix] See, for example, Barry Bluestone, Peter Jordan, and Mark Sullivan, *Aircraft Industry Dynamics: An Analysis of Competition, Capital, and Labor* (Boston: Auburn House, 1981).

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[xv] Markusen, op.cit., p. 308.

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[xxiii] Ibid., p. 2.

[xxiv] The data for the Kauffman study are found generated by the U.S. Census Bureau through its longitudinal data base of Business Dynamics Statistics (BDS). Data for 1997 by age of firm provides a glimpse of what firms are responsible for job creation and job destruction. In that year, there were a little over 6 million firms in the data base which employed over 103 million workers. During the year about 18.5 million new jobs were created by these firms and about 15.7 million were destroyed. Overall, the roughly 526,000 new firm startups in that year were responsible for a little over 3 million new jobs and no job losses. All of the existing firms combined were responsible for a net loss of about 200,000 jobs. See Kauffman, op.cit., Table 1, p. 7.

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