

# **Technopole Milwaukee**

*Construction of an Innovative Milieu*

Prepared by

Jim Dicker, adjunct associate professor and Gil Snyder, associate professor,  
School of Architecture and Urban Planning, University of Wisconsin-Milwaukee  
for the Wisconsin Economic Summit  
November 29, 2000 - December 1, 2000

## **Summary**

Wisconsin is very successful in educating its population, but it is much less successful in supporting the new information economy in which recent graduates are seeking employment. Vibrant economies that require these graduates are those that are engaged in the production of goods and the provision of services that use the newest technologies. The innovative milieu from which these technologies emerge are most often found in cities where places for synergistic exchange abound. If Wisconsin is to take its rightful place as a leader in the advance of the new economy, it must leverage its position as a leader in education. To do this, the state must make a concerted effort to understand the competitive advantages of its cities and use these in an effort to develop technopoles.

### **Wisconsin's Role as a Place for Technical Education**

The state of Wisconsin is suffering a brain drain. The educational system produces far more technically trained people than the state's economy can absorb. Our university system admits and graduates one of the highest percentages of any state's college age students (National Public Radio). The conflict between these two facts is graphically illustrated by a recent visit to computerjobs.com <<http://computerjobs.com/>>. This web site keeps a list of computer related jobs offered throughout the United States. The city of Atlanta had over 7000 jobs listed while the entire state of Wisconsin listed only 170. A recent report in the Milwaukee Journal Sentinel (09.22.00) quoted the president of a human capital consulting group who reported that "fewer than 10% of the executives with whom his firm worked last year were willing to relocate to another city and that 42% said that they would change industries rather than move." This suggests that a state able to educate its citizens efficiently forces them to relocate to other states in order to pursue their careers. Surely Wisconsin's state government and the private sector that funds it are capable of developing and supporting a high-tech sector that can employ the individuals it educates.

### **Cities and Innovation**

Cities and civilization share the same root in our language. The rich culture that is only possible in the dense fabric of living cities is the most productive environment for human enterprise. Cities came into existence and began to evolve with the onset of specialization. A single individual became so competent, so expert at a necessary task that it became possible for that person to sustain his existence by trading the product of his expertise for the necessities of life. The cross fertilization of specialists is the engine that powers the cultural and evolutionary passage of the human species. "...it remains true that over the years and decades most of the world's actual high-technology production and innovation still comes from areas that are not usually heralded as innovative milieus, and indeed may have few of their physical features: the great metropolitan areas of the industrialized world." (Castells and Hall, 1994, p.11)

### **Innovative Milieu**

The history of cities chronicles an endless dialectic tipping from the recognition of problems stemming from density to their solution. Buried in this ten-millennium process are the seeds of innovation from which sprout virtually all human endeavor. In his book, Cities in Civilization, Sir Peter Hall develops a theory of the innovative Milieu. After reviewing Hall's careful argument it becomes clear that places of innovation come into being for a variety of reasons. However, always among these is the density provided by cities. In describing locations that support innovation and job creation he says, "They have strong but often very informal structures for the exchange of technical knowledge and conceptual ideas. Barriers to the diffusion of innovation are so low as to be almost non-existent; there is a constant search for the novel. Levels of synergy, not only between like-minded individuals but also between quite disparate socio-economic-

cultural groups, are very high; this is the archetype of an open society." (Hall, 1998, p.302). This is also the description of a vibrant living city.

Current theories suggest that a new urbanism can be constructed on fresh sites using forms derived from small towns, or adapted from larger cities. This seductive new dream is actually a variation of the old American process of moving on, starting over. Embedded in the dream is the central cause of its stillbirth. The freshness and sanitary purity that it promises are in reality simple sterility. The cauldron of the city with its stew of density and intractable problems is the irritant sand from which civilization fashions its innovative pearls. Although new urban sites may offer the chimera of urbanity, they are only empty vessels. A community of homogeneity replaces one of disparate socio-economic and cultural groups. The richness of the city's tapestry is replaced by a paint-by-the-numbers simulacrum incapable of fostering the synergy required for an innovative milieu. The best hope for re-igniting the spark of innovation essential for the development of the new economy lies in mining the resources that can only exist in the rich veins of real cities.

### **Technopole**

A technopole is comprised of people in an industrial space who generate excellent products manufactured with the latest technology, while also participating in the development of that technology. Cities, regions, and countries that import the technology used to produce their goods will eventually drop behind and fall out of the race for economic superiority. "...in a world governed by competition through comparative advantage, countries or regions specializing in the production of inputs that are required by other industrial structures have a definite advantage. The technological component of products thus becomes a decisive dividing line in the trade between countries. Following Ricardo's classical rule, Portugal specialized in wine and England in manufactured textiles; but, before long, the best port wine was the favorite drink of English gentlemen enriched by the product of their textile mills." (Castells and Hall, 1994, p.5). Clearly, it is not enough to use the latest processes in the production of goods. Constant upgrading of these processes must be designed and implemented if a city or region is to maintain its place in the world's economic hierarchy.

Three critical elements are required for the success of a technopole: the capacity and skill to produce high value goods, research and development facilities dedicated to technologically advanced manufacturing processes, institutions that are involved in the basic research that provides the knowledge base for this effort. These institutions, usually academic, not only provide the intellectual capital, they also provide the continuing source of human capital necessary for the technopole's ongoing success. As people move back and forth between the various enterprises engaged in manufacturing, research and development, and academic inquiry, a culture of synergy is created. The creation and nurturing of this culture drives the engine of innovation forward.

## **Infrastructure**

The success of the technopole is without exception linked to the development of transportation systems, communication networks, and energy supply grids. The rapid flow of people, goods, supplies and ideas is essential for the development and maintenance of an innovative milieu. The future success of a Milwaukee technopole must be founded on a strong infrastructure. To support the successful establishment, incubation, and continued operation of high-tech focused research and manufacturing enterprises, a multi mode transportation network must be in place along with secure energy supplies and wide bandwidth data channels.

## **Transportation**

The growth and evolution of great cities can often be gauged by following the development of its transportation network. This holds true for Paris, London, and New York as well as for Los Angeles. The development of the subway system in the first three and the vehicular network in the last have provided the vascular system that has supported growth and most importantly redevelopment. Densities in New York can be mapped by drawing concentric circles with their centers emanating from the subway stops. High densities and the accompanying economic activities associated with them are directly related to the supply of people delivered to those locations. Rockefeller Center, Grand Central Station, Penn Station, and Times Square have developed in direct relation to the complexity of the subway intersections beneath them. New York's point-to-point subway system is supported by a hierarchical grid of surface transportation routes, upon which are grafted the communication and energy supply systems. In order to provide for and support the pattern of density essential for the cross fertilization that supports innovation, Milwaukee must enhance its transportation network.

## **Communication**

The speed of communication is limited by the capacity of the lines through which it flows. Standard telephone lines allow an information flow of only 14.4 Kbps or 14,500 bits per second. Fiber optic cables and high-speed wireless networks will be necessary to satisfy the demand of an information based job market. Fiber-based structured cabling systems are increasingly being installed as the backbone of local area networks. For these systems to be productively connected to the internet, they must be able to directly link to long distance fiber optic cable supported by the necessary network hubs and switches.

## **Energy**

The secure and dependable supply of energy is essential for the operation of many enterprises that rely on continuous computer support. Led by banking and insurance firms, more and more businesses are investing in fuel cell technology as the primary or backup sources of energy. Not only does this investment insure continuous computer operation, but it pays a collateral benefit of reduced greenhouse gases. The efficient chemical conversion of fossil fuel to electricity produces no pollutants.

## **Historical Development of Milwaukee as an Innovative Milieu**

From its earliest settlement by Europeans, Milwaukee was a city of enterprise. As the object of that enterprise shifted from fur to grain to beer, entrepreneurial effort continued to be based on the harvest of natural resources. Great plans for canals and rail systems were designed to bring the fruits of the land to Milwaukee to be processed and shipped. At first, the city exploited its advantages as a port by exporting raw goods like fur and grain. Subsequently, value was added to raw materials as processed products such as beer and leather were manufactured in the city, and exported to other regions. Following the Civil War, lessons learned in the processing of raw materials were applied to the design and manufacture of machinery and machine tools. "There was sweet irony in Edward Allis's success. Milwaukee had entered the post-1865 period as a world center of the wheat trade and a leading miller of flour. Those laurels passed to Minneapolis, but manufacturing had its compensations: By the 1890s, nearly eighty-five percent of the milling machinery used in the Twin Cities was supplied by E.P. Allis and Company." (Gurda, 1999)

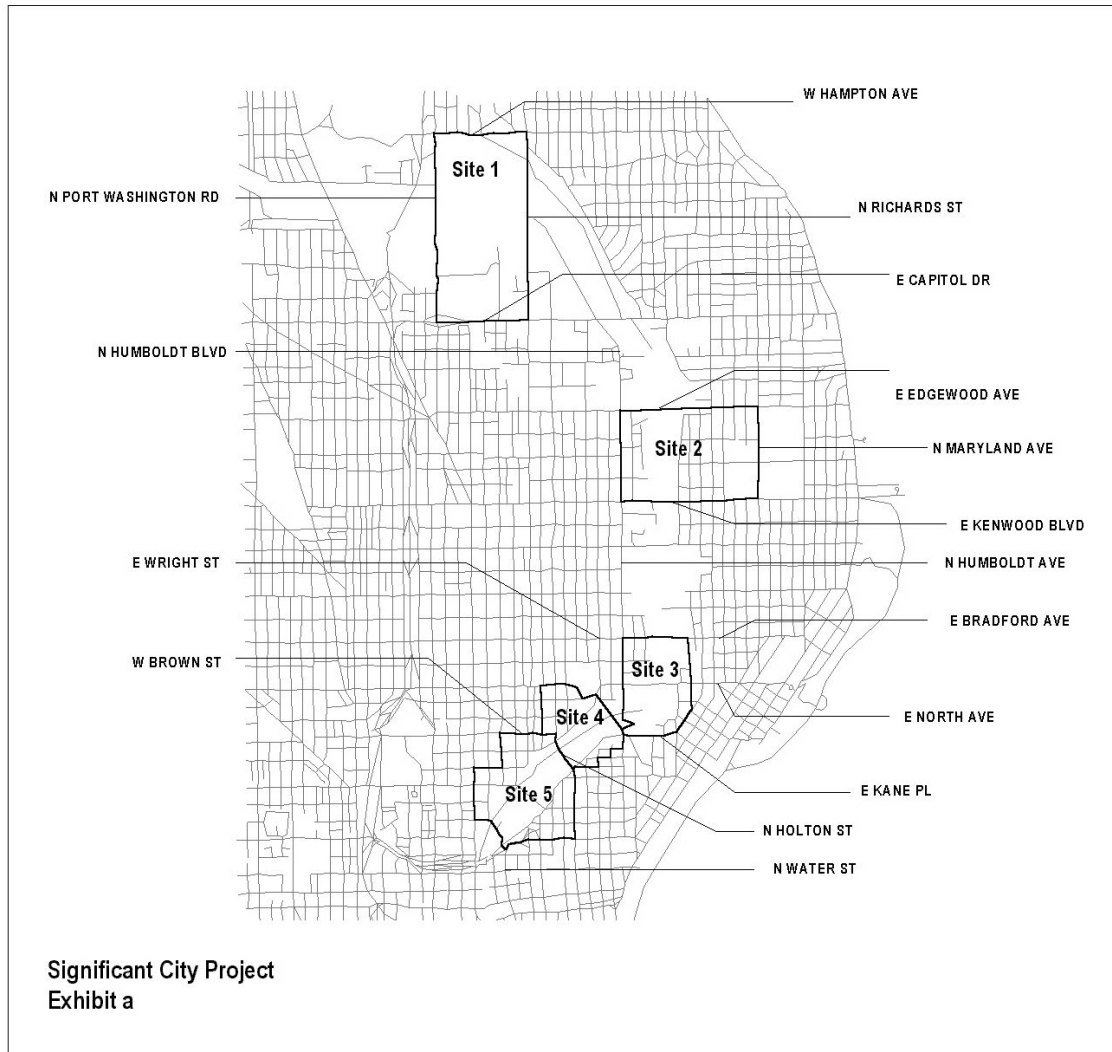
The design and production of machinery was the backbone of Milwaukee's economy for most of the twentieth century. The recessions of the early 1970's and 1980's that led much of the Midwest to be proclaimed a rust belt dealt a severe blow to the fortunes of Wisconsin's largest city. Although the university system continued to turn out graduates equipped to work at advanced levels in the new economy, the enterprises that formed the its foundation did not develop in Milwaukee. During the time that the state university system nurtured the growth of a second state research university in Milwaukee, it saw the graduates of its programs increasingly seek employment in other states and regions. It is time to development and implement a long-term economic plan that can make Milwaukee once again a city that develops and manufactures products based on the latest technology.

## **Technopole Milwaukee**

The XYZ Studio at the University of Wisconsin-Milwaukee's School of Architecture and Urban Planning is examining the possibility of stitching a technopole within the existing fabric of Milwaukee. There are three general propositions that inform this investigation. 1. The creation of an innovative technical milieu must link key existing assets of the city while expanding on their potential to fuel the growth of high tech product development and manufacturing. 2. Development must create places where chance encounters between individuals can lead to exchanges that contribute to the essential synergy required for the success of the enterprise. 3. The quality of life created by development must not only hold those qualified individuals all ready living within the city's borders, but must be compelling enough to attract those from outside. As architects, our task is to understand the form of cities that are the true centers of human innovation, and apply that understanding to the creation of new urban forms that make space for that processes of innovation to continue.

An initial examination of assets currently in place suggests that synergistic relationships can be developed by linking the central business district (CBD), the UWM community and a developing technology park at the Milwaukee/Glendale border. The map of

Milwaukee clearly illustrates how the Milwaukee River ties these three areas together. The connection of these sites in a web comprised of economic, historical, cultural, and geological strands will create a dense technical spine along the Milwaukee River Corridor. Five sites were selected for investigation (See exhibit a).



During the initial planning stage two additional assumptions emerged. In order to assure the density required at each site, a rail link connecting the Northern suburbs with the CBD was assumed. It was also decided that the primary enterprise along what was termed the Milwaukee River Corridor would be the research, development, and manufacture of bio-medical products. Although this would be the unifying focus of development, students were encouraged to find the singular essence of each site.

The program informing each area was discussed in terms of a typology used by Louis Kahn that suggests human activity can be understood as belonging to three basic classifications; dwelling, work, and community. The immediate context was examined in order to determine the type appropriate for each site. Although all three activities might often be found in an area, the students were asked to create a masterplan demonstrating a clear hierarchy. In addition to programmatic themes, each site was evaluated by

assessing its relationship to the formal conditions of crossing, overlook, and edge. These conditions emerged as the relationship between the geological features of the river valley were engaged by the human designed city organization.

The formal conditions and program of each site suggested a strategy for the enhancement of the existing infrastructure. Students examined the possibility of building fuel cells, and high-speed data transmission facilities. Constant attention was paid to the specific conditions created by the insertion of the rapid transit line along the river valley. The redevelopment of this section of Milwaukee as a high-tech enterprise zone was always balanced against its place as a livable city. The success of the design is dependent on the ability of the river corridor to function as a multi-function, 24-hour urban system. The first product of this investigation will be available for examination at the Wisconsin Economic Summit.

Milwaukee was established as a center of enterprise that developed and evolved by adapting to and exploiting new technologies. However, the collapse of the heavy industrial economy left the city in a state of shock and amnesia, erasing the collective understanding of innovation. For years, the economy has been sleepwalking, collecting dividends from investments made in the past. The time has come to reinvest in the engine capable of driving the state of Wisconsin into the future. Many of the assets required are all ready in place. Milwaukee has the essential, rich mix of culture, history, and enterprise necessary to stimulate an innovative milieu. It is located in a state that produces a surplus of highly trained technical workers. Its airport has excess capacity. Two major universities and numerous other institutions of higher learning lie within its borders. A beautiful river valley connecting many of these assets has the potential to be transformed into a unifying feature unparalleled in U.S. urban geography. We believe that places for synergistic exchange designed and developed along the river corridor will contribute to making Milwaukee a significant city in the twenty first century.

### **Action Plan**

The analysis and visionary planning undertaken by the students at UWM's School of Architecture and Urban Planning should be applied to other sites throughout the state. Interdisciplinary teams should conduct examinations of cities within the state in order to determine their potential as technopoles. Once the competitive advantages of these cities have been assessed, urban designs should be generated that build on those strengths. Wisconsin must stop squandering the human capital it has so successfully developed. It must apply all the resources at its disposal in a concentrated effort to take advantage of the creative synergy currently hibernating in its cities.

## **Bibliography**

- Benevolo, Leonardo, 1981. The History of the City, Cambridge: The MIT Press.
- Boyer, M. Christine, 1996. CyberCities, New York: Princeton Architectural Press.
- Gurda, 1999. The Making of Milwaukee, Milwaukee: Milwaukee County Historical Society.
- Hall, Peter, 1998. Cities in Civilization, New York: Pantheon Books.
- Hall, Peter and Castells, Manuel, 1994. Technopoles of the World, London: Routledge.
- Sassen, Saskia, 1991. The Global City New York, London, Tokyo, Princeton: Princeton University Press.