# THE SHAPING OF CREATIVE COMMUNITY IN THE NEW MILLENNIUM: THROUGH KNOWLEDGE AND INNOVATION-BASED DEVELOPMENT

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## INTRODUCTION

*"In the 1980s, there was talk about the transition from the Industrial Society to the Information Society. In the 1990s, it was about the Knowledge Society. Success in the future will be based on our ability to think and act creatively - the Creative Society."*

- *Professor Mitchel Resnick of MIT*

California's Silicon Valley and the Route 128 Corridor in Massachusetts have famously fostered creative communities through the synergy of the research and development (R&D) industries (the Innovation Community) and research universities (the Knowledge Community). These successful models of innovation and economic competitiveness continue to transform themselves to stay on the leading edge. They have sparked the growth of high tech areas around the world that have followed a similar development model and land use characteristics.

China has developed many high tech parks, and its cities have invested heavily in higher education. Campus-like settings for high tech and R&D offices are typically located in the outlying areas of a city or a new town, away from the vibrancy and interactivity of urban life. And brand new university campuses too often fence themselves off from the surrounding community. Typically, this kind of development is not successful in forming attractive communities, and it works against financial sustainability.

However, if integrated, these primarily single-purpose developments could better capitalize on talent, encourage more innovation, enhance economic competitiveness and also provide attractive options to constituents through enhanced quality of life.

This paper will address various issues relating to physical development of successful Knowledge- and Innovation-based communities:

- Defining Creative Community
- Analyzing key elements of development
- Maintaining competitiveness
- Trends and forces shaping transformation
- Developments in China
- Investing in Knowledge- and Innovation-based development

Key attributes in the physical environment of these communities:

- Rich in diversity
- Encouraging Interaction
- Proximity of multiple knowledge and innovation uses
- Shared resources and facilities
- Amenities
- State-of-the-art infrastructure
- Flexible and adaptable to change
- Transit and Walkability
- Urbanity

## DEVELOPMENT CHARACTERISTICS OF CREATIVE COMMUNITY

A creative society, or community, is based on ideas generated by human capital. It produces goods and services that create, teach, generate technical innovation, drive design and cultivate change. (1) Creativity-based industries produce an enormous amount of revenue, employment and opportunities.

**Key Elements of Creative Community: Innovation and Knowledge**

Synergy between the Innovation Community and the Knowledge Community leads to new ideas and an entrepreneurial culture. Key elements:

- Research and Development (R&D) based industries - the Innovation Community
- Research universities - the Knowledge Community
- Public and private investment, venture capital to support innovation
- A setting conducive to attract and retain talent

An economy dominated by creativity may include design (art, crafts, fashion, product design), architecture and engineering, advertising and publishing, entertainment, research and development, hardware and software development. (2) This proliferation of other creative, innovative talent in a traditionally computer- and engineering-dominated world should be noted.

Some group the creative economy participants into the super-creative core and the creative professionals (3):

1. Super-Creative Core: Computer and mathematical scientists; architects and engineers; life, physical, and social scientists; educators, trainers, and librarians; and artists, designers, entertainers, professional sport players, and media

2. Creative Professionals: Managerial, business and financial operations, legal, healthcare practitioners and technical, high-end sales and sales management

Pillars of the creative economy, both groups rely heavily on the collaboration of the Innovation and Knowledge communities.

**Maintaining Competitiveness**

In Silicon Valley, research shows that the key attributes for success are the availability of a large and skilled talent pool, the proximity of other industries/support services, access to capital, and desirable quality of life. The integration of these conditions creates the entrepreneurial culture that is highly conducive to innovation and is essential to Creative Community. (6)

Silicon Valley dominates other high tech clusters in the United States such as Silicon Forest in Seattle, Silicon Coast in southern California, Silicon Hill in Austin, Boston's Route 128, Silicon Dominion in Washington DC and Silicon Alley in New York City. While cumulative efforts come under the heading of “high tech,” the specializations are wondrously varied – from IT software and hardware to nano-technology and bio-tech. Flexibility in adapting to new technology as well as a sense of openness and sharing characterize these regions.

**Figure 1.**
Source: “Internet Cluster Analysis”

**Trends and forces shaping transformation**

These creative communities are evolving. In response to the needs of their constituents, these communities are becoming more urban in their character and more diverse in business, land use, housing affordability, with easy access to education and research and a wealth of cultural and recreational amenities.

University campuses are also changing rapidly in response to changing education delivery methods, research culture and campus demographics and the need for town and gown collaboration. Increasingly, these knowledge-based communities interact and collaborate with innovators in industry, leveraging creative ideas for commercial advantage and sustained growth (1). Boundaries are blurring.

**INNOVATION COMMUNITY TRENDS**

Silicon Valley, which has survived 40 years of boom and bust in defense, semiconductors, computers and dot-com mania, is reinventing itself once again. "We are shifting from an economy that is industrially focused to one that relies on creativity for the consumer," said economist Doug Henton, principal author of "2006 Silicon Valley Index."

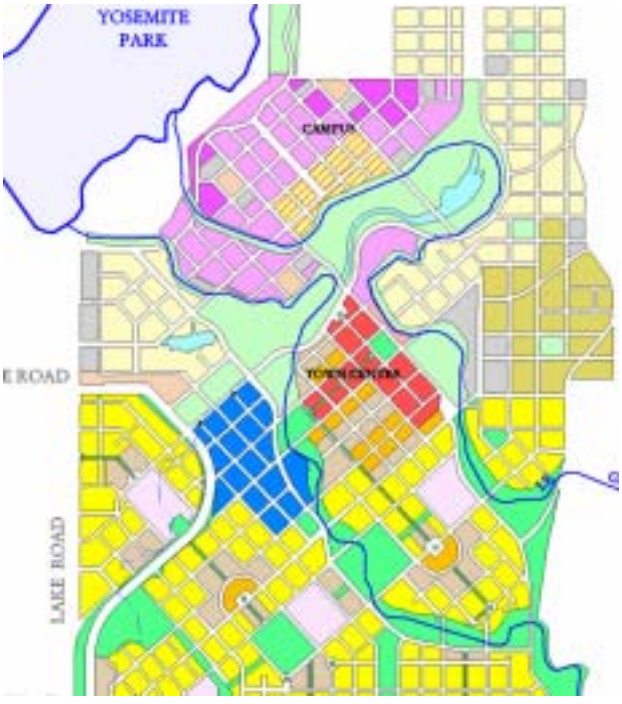
Although the software and biotechnology payrolls remain strong, a new industry grouping called "Creative and Innovation Services" is especially noteworthy. This newly defined niche includes accountants, designers, marketers and other professionals who turn ideas into products or companies. Apple Computer's wildly successfully iPod music player – creative and consumer-driven – is one such innovation, thanks to the broad array of talent available in Silicon Valley. (4).

Much of this talent is young, single and interested in the diverse housing, convenient retail, and rich mix of cultural, entertainment and recreational life found in cities. For just these reasons, many high tech professionals live in Manhattan and reverse-commute to work in Einstein Alley, the high tech corridor in New Jersey.

**KNOWLEDGE COMMUNITY TRENDS**

A key ingredient of the creative economy, university campuses in the 21st Century are no longer a fortress on the hill. University and research campuses used to be a compound only for students and the intellectual elite including faculty and researchers. This “safe haven” fostered education, debate and experimentation without the distractions of non-academic life.

**Figure 2. LAND USE FOR UNIVERSITY OF CALIFORNIA MERCED AND ITS COMMUNITY AREA IS INTEGRATED WITH CONNECTING RETAIL, ADMINISTRATIVE AND STUDENT SERVICES**
Source: Author



Today however, what is being called tertiary education is defined as a lifelong pursuit. Education is no longer just the one-way delivery of a commodity called “knowledge.” It is process-based, with emphasis on thinking, two-way dialogue, methodology, experimentation, research and innovation. Students and faculty are engaged in exploration together. Experience and interaction between campus and industry is increasingly important, in particular for graduate and professional schools.

Student populations in tertiary education institutions are not just young people between the ages of 18 and 24. Some work first, then attend college. College graduates also return to attend graduate school or for continuing education. Active retirees return to college to acquire new skills.

Convenient access across the Innovation and Knowledge communities is in demand. University faculty are no longer confined to full-time teaching. Active involvement in professional practice and R&D industries is very common and encouraged. As a result, many universities offer classes in close proximity to work places. These institutions occupy spaces downtown and in their communities to serve a broadened range of constituents.

Development opportunities are not confined to small retail services but also include new real estate development opportunities for collaboration space, housing around a campus and educational space in the downtown near the workforce.

**Knowledge and Innovation Communities in China**

Like other fast-developing countries, China has developed many high tech parks whose campus-like settings house R&D offices and light manufacturing facilities. Such developments often consist of work places with worker housing located in the outlying areas of a city or in new towns with ample land but away from the actions of urban life. While not all tech parks needs to forge innovation, few of these areas have capitalized on their potential. Beijing’s Zhongguanchun Area is one of very few exceptions, but most others are high tech parks in name only.

Many Chinese cities have also invested heavily in higher education. Brand new university campuses are being built in large areas dedicated to higher ed. Shanghai Songjiang University City and Hebei Langfang Dongfang University City were built earlier. The Nanjing Xianling University City, under construction, is supposed to become one of the largest in China. There are almost 50 “university cities” in China. They range from 4 sq. km (1,000 acres) to as big as 70 sq. km (18,000 acres). In general, they consist of entirely separate campuses, faculty and staff housing and support commercial/retail services. They, too, are mostly located in outlying areas of cities. Although they are like cities within a city, their layout discourages interaction among separate campuses and does not facilitate collaboration with nearby Innovation communities.

The monolithic land use pattern of these developments departs from the known models for success – an area for co-location, interaction and synergy, which is based on mixed use. Although some uses could not co-locate due to environmental issues, a more integrated approach in land use and inclusionary types of development could spark more innovation, improve economic competitiveness and enhance quality of life.

Although the Silicon Valley model of business parks in close proximity to universities has been replicated in many cities around the world, the essence of town-and-gown integration has not been fully understood in China. In particular, the development of many new Economic Development Zones and university cities in China has yet to reach its full potential.

**ATTRIBUTES OF KNOWLEDGE- AND INNOVATION-BASED DEVELOPMENT**

*The “creative tension” generated by the mingling of people from different fields, different backgrounds, and different expectations makes a critical contribution.*

*Among other things, such experience helps provide not only knowledge and information that people don’t know they need, but also the skill to judge the worthwhile from the worthless – an increasingly important skill in an age of ubiquitous and often unreliable information.*

- *Philosopher Karl Jaspers*

The Creative Community of the future is a place for people from different fields, different backgrounds,

and different expectation to meet, work, research, live and play. It is where the Innovation and Knowledge communities interact and innovate. A number of attributes define the physical environment that will attract and retain the constituents of this 21st Century community.

**Rich in Diversity**

A diverse range of uses, types of facilities and range of affordability are essential to address the needs of the Creative Community. Edges between different uses and entities no longer demarcate territories but rather present opportunities for collaboration and integration.

Mixed-use developments are more desirable than single use zones, unless prohibited by environmental issues. A lively urban setting with office, housing, education, retail entertainment and community services will serve constituents' needs.

A broad range of office or workspace types will attract diverse establishments where experimentation, innovation, and mentoring can take root (mentor, growing, start-up companies and university research labs). A mix of established and emerging companies will settle in close proximity.

A varied range of housing and affordability should be located in close proximity, to enable people to live near their work. This will counterbalance the market trend for upscale development. Housing types could include larger family units, smaller 1- or 2-bedroom units, studios, live-work units, and, to accommodate transitory workers, service apartments. The mix will fit multiple styles of living and working. It is critical that the needs of all sectors of the workforce be met. Government policy may be needed to achieve housing diversity.

**Encouraging Interaction**

The Creative Community is synergistic: a place for the mingling of people with diverse background. Places for interaction encourage chance encounters among constituents in both the Knowledge and Innovation communities such as university faculty, researchers, students, high tech workers, service providers, investors, entrepreneurs, innovators and other professionals.

Constituents should be provided with ample opportunity to engage with one another formally and informally, at work and elsewhere. The built environment can encourage the sharing of ideas as well as facilities, equipment, and other resources. A mix of retail shops, community, cultural, recreation, entertainment and outdoor amenities provides multiple places for business and casual interaction.

Buildings and floor layout should be designed to encourage collaboration and interaction. Elements that can instill this include larger foyers, broad walkways, inter connecting stairs with space for casual meetings and outdoor meeting space. The Stata Center at the Massachusetts Institute of Technology (MIT) has a broad boulevard in the building with bench seating, wireless internet access and lots of space for sitting, meeting, contemplating or even doing homework. An excellent building typology, it is a space to be and to be seen.

**Proximity of Multiple Knowledge and Innovation Uses**

Elements of the Knowledge and Innovation communities located close to each other provides convenient and sometimes unexpected access among workers, researchers, students and faculty. The Knowledge Community delivers education and conducts research near places of work. Research and professional practice in the Innovation Community tends to occur on campus.

San Jose State University, located in the center of San Jose provides 55 percent of the engineers in Silicon Valley. Its proximity to high tech business enables students to intern part-time at nearby industries, working professionals to attend night school, faculty to practice and businesses to sponsor educational or research programs tied to their specific needs.

**Shared Resources and Facilities**

Both the Knowledge and the Innovation communities benefit from sharing. Identifying mutual need and pooling their purchasing power helps each to acquire equipment and other resources that single entrepreneurs or smaller companies cannot afford on their own. In many incubator office developments, meeting and conference facilities, exhibition space, administrative services and professional support are

provided as shared facilities so that the entrepreneurs focus on their own projects. This also develops an atmosphere of collaboration.

In Chicago, several night school campuses are located in close proximity along State Street. Two universities jointly developed student housing, helping both to share costs and meet demand, which, if built independently, would have been challenging if not prohibitive. This also provided opportunities for students of different specialties to mingle and interact. Investment in the area even fostered nearby commercial development, bringing new vibrancy to the neighborhood.

**Amenities**

Creative constituents demand a full range of retail, community services, recreation and entertainment, and cultural amenities. This differs from the early days of high tech, when work was the only thing in life.

Palo Alto exemplifies a good mix of amenities, and the city retains its rank as the epicenter of Silicon Valley. The University Avenue area is lined with restaurants, cafés, a wide array of retail stores, cinemas, travel agents, art galleries, boutique hotels, etc. It is the social heart of the Valley.

**State-of-the-Art Infrastructure**

Fault-tolerant, state-of-the-art infrastructure systems support the delivery of a balanced and connected Knowledge and Innovation Community. High-speed broadband internet access, telecommunications, and sufficient electrical supply are critical. Infrastructure must be reliable and highly secure. But, to accommodate technology's ever-changing needs, it must also be highly flexible.

Adaptability will enable initial design as well as future adaptations to be undertaken in an efficient, scalable, and cost-effective way. This enables the Creative Community to maintain its edge beyond the foreseeable future.

**Flexible and Adaptable to Change**

In 1965, Intel co-founder Gordon Moore saw a piece of the future. His prediction, popularly known as Moore's Law, states that the number of transistors on a chip doubles about every two years. This observation about integrated circuits has fueled the advancement of technology worldwide. The reality, since then, is that each generation of IT technology only lasts about two years. (7)

Planning and building for the long term is enormously complex, fraught with peril, and unquestionably necessary. To succeed, flexibility must be factored into the obvious places – to accommodate changes in telecommunications and technologies – as well as into far less obvious or predictable procedures that can support entirely new kinds of uses by a new breed of users.

It isn't practical or cost-effective to pull buildings down after a few years and start again. Buildings, floor plate size, infra-structure, land use restrictions, financing structure, and leasing terms all needs to be flexible to adapt to changing needs and technology.

**Transit and Walkability**

A pedestrian-friendly network of streets, pathways and a convenient public transportation system to discourage use of single-occupancy automobiles is not only environmentally sustainable, it is key to encouraging interaction.

Buildings with interconnected public stairs and housing that encourages walking are also essential to instill a sense of community and collaboration.

**Urbanity**

In contrast to suburban and car-dominant outlying locations, cities are more attractive to the Creative Community. The quality of life in cities, along with higher density that affords more retail and cultural amenities, is much sought after by the constituents of the Knowledge and Innovation communities.

San Francisco evidences the point, with some saying that it is becoming a bedroom community for

Silicon Valley. High tech workers live in the city and reverse-commute to the Valley. It is the quality of life, density and excitement of the city that draws them.

## CASE STUDIES

Knowledge- and Innovation-based development projects are discussed below, representing both new and redevelopment efforts.

### Mission Bay Life and Health Science Area, San Francisco

Baseball and bio-tech form the unlikely combination of creative forces in San Francisco these days. In 2000, a new in-town, bay front ballpark led off the resurrection of the city's South Beach and South of Market neighborhoods. Just across McCovey Cove and Mission Creek from the Giants' AT&T Park, construction was also underway on a 43-acre life sciences research campus for the University of California, San Francisco (UCSF). Since Genentech Hall, a major bio-tech laboratory facility opened to scientists in 2002, other research facilities have been completed. Student housing and a community center have opened as well. The UCSF project, stunning enough in its progress, is part of a larger whole. It lies within the 303-acre Mission Bay Redevelopment Area, one of the largest brownfields re-use and urban revitalization projects in the country.

Together, Mission Bay and AT&T Park have attracted multiple components of neighborhood-building – improved and new infrastructure, much-needed housing and retail services, walkability, expanded public transit, commercial enterprises both large and small, and odd-sized bits of open space. In all, it bodes well for the ongoing reclamation of the city's Central Waterfront and propelled San Francisco's leadership in bio-tech research.

**Figure 3. MIXED USE DEVELOPMENT IN MISSION BAY HAS BEEN SELECTED TO BE THE HQ LOCATION FOR THE CALIFORNIA INSTITUTE OF REGENERATIVE MEDICINE (STEM CELL RESEARCH)**
Source: Author

In a finer-grained example, UCSF's Mission Bay campus acted as a magnet for other knowledge workers. Early in 2005, the newly established California Institute for Regenerative Medicine (CIRM) began its site search for its future permanent headquarter office. The request defined space needs, lease terms, and the imperative to be near other professionals engaged in biomedical research. The request called for easy access to public transportation, an international airport, and nearby conference facilities – and to hotel accommodations very close to those facilities.

But the CIRM subcommittee also sought quality of life features and wanted its research headquarters to have proximity to an array of other creative talent. The city of San Francisco won that hard-fought competition with an incentive package estimated to be worth $17 million, and the organization located in an existing South of Market mid-rise in the Mission Bay Redevelopment Area.

### University Park at MIT, Cambridge

This 27-acre development by a private developer, Forest City Enterprise (5), converted industrial land adjacent to the MIT campus into a vibrant mixed use area. It includes 1.7 million sq. ft of commercial

space, a boutique hotel, and 410 units of market-rate and affordable housing. New park and plazas as well as pedestrian friendly streetscapes were built.

University Park abounds with on-campus amenities. The Hotel@MIT offers high-tech accommodations. A restaurant, bar and café provide full-service dining and entertainment, and a large grocery store offers convenience for employees and residents alike. Other amenities include retail shops, banking services, a childcare center and a series of art programs and special events held throughout the year. (5)

The development is easily accessible by car, bus, bike, or subway. Its own shuttle bus service connects University Park's major office, retail and transit nodes in the city.

**Figure 4. THE UNIVERSITY PARK AT MIT IS A SUCCESSFUL KNOWLEDGE AND INNOVATION BASED DEVELOPMENT CONSISTING OF R&D OFFICE, RETAIL, HOUSING AND A HOTEL; ACCENTED WITH NEW PUBLIC OPEN SPACE/PLAZA AND ATTRACTIVE STREETSCAPE.**
Source: Author

**Application of Knowledge and Innovation Development Model in China**

SHANGHAI YANGPU KNOWLEDGE AND INNOVATION COMMUNITY

The Shanghai Yangpu Knowledge and Innovation Community (SKIC) offers the opportunity to capitalize on existing resources to promote economic development and community revitalization. Yangpu District in Shanghai was the location for Shanghai's first industrial development along the Huangpu River during the early 1900s. By the late 1980s, factories had moved or closed, leaving large tracts of dilapidated buildings and empty brownfields. The district is now primarily residential with a one-million population. In addition, the district has 17 universities and colleges and more than 200 research institutions. This Knowledge Community comprises a large and diverse talent pool and no small measure of entrepreneurial spirit. But these campuses are closed in on themselves, each with on-campus housing for students, faculty and staff. They are separated from the surrounding residential neighborhood. The opportunity here is to attract other desirable constituents and develop a setting conducive to nurturing an entrepreneurial, collaborative culture.

In the planned Shanghai Yangpu Knowledge and Innovation Community (SKIC), the existing constituents are being joined by other knowledge workers with the expectation of establishing a thriving entrepreneurial culture. Innovators and small businesses are being welcomed. It is essential, therefore, to develop an atmosphere of collaboration, not only for the sharing of ideas but also the sharing of facilities, equipment, and other resources.

There are three major components of the SKIC: the Technology Park; the University Village; and the Technology Hub. The Hub functions as an extension of individual businesses. By taking advantage of services and support and advisory assistance, small businesses can stay intently focused on entrepreneurship. At another level, shared meeting and conference facilities are available along with high-tech trade mart space and office and exhibition space. The site also offers leisure entertainment, shopping, eating, cultural uses, and wellness amenities. Highly energized open space, some expansive and some small, invites activity or lingering.

Because individuals in technology-driven communities often work long and irregular hours, the Hub caters to their needs by also providing special shared amenities. That may include cafes, gymnasiums,

playing fields, or facilities for cultural activities. Altogether, this creates an environment of far more ease and comfort than a typical office building offers.

**Figure 5. THE SKIC HUB, WITH CO-LOCATION OF ESTABLISHED COMPANIES (MENTORS), START-UP COMPANIES (INNOVATORS) AND SHARED AMENITIES, IS THE IDEAL MODEL FOR INNOVATION BASED DEVELOPMENT.**
Source: Author


Just north of the Tech Hub, small and large businesses will locate in Technology Park, which will provide additional centralized technological and professional support. This includes e-commerce services, a shared knowledge depository, intranet and extranet services, and more co-location facilities. Data security and solid infrastructure are assured.

Throughout University City, flexibility is critical to long-term success. Building floor plates themselves will be easily changeable. Live/work spaces will be designed for fast and simple conversion. Across other types of tenant and co-location facilities, short leases will support turnover to occupants who need a differently scaled space.

Technology-based exchanges among like-minded individuals, whether scientists or educators, promise speed and efficiency and tremendous opportunity. Author and educator William Mitchell rightly describes how network technology has enabled “discontinuous, asynchronous global agoras” to flourish and establish new kinds of extended communities. But human interaction is critical, as well, for a knowledge community to thrive. The SKIC’s many shared resources bring face-to-face interaction back to a technology-driven and often-isolated community.

The first phase of the SKIC is under construction. It is expected to open in late 2006.

## INVESTING IN KNOWLEDGE- AND INNOVATION-BASED DEVELOPMENT

Knowledge- and innovation-based developments are not only the engine for economic prosperity but also represent tremendous real estate development opportunities to contribute to Creative Community. Demand is high in China to capitalize on existing investment in single-use technology parks or Economic Development Zones by adding the resources needed to catapult existing development into a model of shared developments such as housing, retail and entertainment, support offices and community services. The space needs of these communities are stable and have longer-term commitments and the investment diversification to counter market fluctuations.

## CONCLUSION

The Knowledge and Innovation communities have the opportunity to leverage academic, cultural, and historic strengths to achieve true leadership in the fast-moving world of high tech development. They can also enrich cities and nations by developing knowledge- and Innovation- based economic growth.

In these communities, learning and working will be inseparable, there will be few boundaries, and elements that encourage interaction and collaboration will be highly desirable. Accessibility and proximity of related facilities will be essential, with shared resources providing huge opportunities.

Non-physical development elements are also critical to success. The essentials include government

policy, venture capital and other funding, technology support, investment in infrastructure, and programming to share knowledge and technical expertise.

In China, if the vast investment of the central and local governments in university cities and other developments would instead be pooled into more integrated, mixed-use areas, creativity and innovation would surely flourish. The result? An ever-transforming Creative Community of the 21st Century.

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