Smart Communities In Action

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Browsing the World Wide Web renders a sampling of how other areas are approaching the idea of developing smart communities. However, the International Smart Cities Institute (ISCI), which conducted detailed research to better understand the state of the smart community worldwide, provides the following examples.

Smart Valley—San Mateo and Santa Clara County, California: Silicon Valley (add link to http://www.svpal.org)

Smart Valley is probably the most famous smart community, stemming from its Silicon Valley roots. Although it has been known to cover more or less the nine counties in the San Francisco Bay Area, it is really more "virtual" in nature. Smart Valley and the success of the Silicon Valley area emerged as a result of an economic downturn in the region in the early 1990s. Its originators describe it as "serving as a real-life pilot demonstrating the benefits of an electronic community" by working with businesses, local government, and community groups to create a 21st century community in Silicon Valley.

Smart Valley's primary role is that of a facilitator or catalyst for collaborative projects in education, health care, commerce, government, and the community—all of which have an interest in the implementation of more useful and productive information technology applications. Smart Valley, as other smart communities attempt to do, simply seeks to build bridges between these groups and, as a result, achieve results.

Smart Valley works from a bottom-up strategy, harnessing government, industry, and grass roots support to develop useful applications of technology. However, it is not a government organization, nor does it receive government support. It is a non-profit and financially independent organization with its own board of directors. Joint Venture: Silicon Valley Network (JVSVN), a collection of economic development organizations in the region, was instrumental in increasing the visibility and support for Smart Valley during its inception. Joint Venture's projects focused on content, process re-engineering, and economic development. Smart Valley complements this effort by focusing on the technology and applications that enable strategic change to take place rapidly. It helps to create and facilitate the implementation of projects that accelerate the adoption of technology in various sectors of the community with emphasis on education and local government.

Smart Valley supports projects by:

- Providing assistance in locating collaborative partners.
- Identifying financial resources.
- Providing volunteers.
- Offering assistance in grant applications and other start-up organizational support such as public relations.

These projects must demonstrate the value of technology as a means of positively addressing regional problems such as improving the information infrastructure of the schools, streamlining local government,

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creating alternatives to transportation gridlock, and facilitating youth employment.

However, Smart Valley makes it clear that it cannot support every project. Project participants are required to have sufficient commitment and management skills to deliver results. Potential projects also need to be demand-driven and supported by user needs and applications. Other Smart Valley criteria require demonstration that the project will have lasting and positive effects in the Bay Area. This includes a strong component of public benefit and the use of advanced information and communications technologies. There is a high likelihood of these becoming standards to be applied to more extensive applications.

For example, a Smart Permitting steering committee (a joint venture project of JVSVN and Smart Valley) was formed to significantly reduce the municipal building and land-use permitting process through "electronic-permitting." It focused on two main efforts:

- To develop software for communities to manage their permitting process.
- To undertake a demonstration of a network-based electronic process which takes advantage of the Internet.

Here, both the private sector and government win through the development of an advanced technology-based process delivering a greater public good. Other projects include the Smart Voter project, which helped over 10,000 area voters to understand their election choices. Another project, the $27 million SmartSchools PC Day project, was a public/private partnership that delivered thousands of new Pentium computers to area classrooms. This initiative resulted in more than 10,500 networked classrooms in 470 schools, creating the largest community school network in the world.

Connect96, an international gathering at Stanford University, attracted delegates from electronic communities in 16 countries to share information on developing smart community networks and applications. Smart

Valley is home to the Telecommute America (www.att.com/Telecommute_America) website, which offers information on telecommuting as an alternative to freeway commuting. Smart Valley also launched the nation's first publicly accessible Internet kiosk utilizing high-speed cable modems. The kiosk is located at libraries, retail outlets, and city and county administrative offices.

Blacksburg Electronic Village— Blacksburg, Virginia (www.bev.net)

Located in southwest Virginia, Blacksburg has a student population of 22,000 at Virginia Tech—nearly matching its regular community population—making it one of North America's most computer literate communities. Blacksburg's economy was in decline because of its natural resource industries and heavy manufacturing past. In an attempt to revive the economy, community leaders turned to information technology and communications as the drivers for its future economic growth. They sought to develop an extensive high-speed, two-way information network accessible by the entire community in an effort to generate a new information society. A pilot project was created in 1993 called the Blacksburg Electronic Village (BEV), which had over 500 users online within the first few months.

It is important as a smart community prototype because it is considered the first "integrated community network" of its kind that provided access to every home, business, and classroom in town. It is also one of the first networks to be developed through a public/private partnership (Town of Blacksburg, Bell Atlantic Southwest, and Virginia Tech). It offered a variety of services throughout the community such as electronic mail, World Wide Web servers, virtual terminal access, bulletin boards, electronic conferencing, gopher servers, and switched video. It wasn't the infrastructure that was deemed essential, but rather the applications and uses that the network offered.

The key economic development aspect of this initiative was the potential of the

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community to advertise its substantial community-wide linkages as a national beta-testing site, thereby attracting commercial users who could test new products and delivery mechanisms. Along with increased services came increased use, adding further residential, educational, civic, and commercial applications:

- Financial services.
- Distance education.
- Educational curriculum support.
- Home instruction.
- Library services.
- Parents' monitoring courses.
- Medical support.
- Retail services.
- Business information.
- Telecommuting support.
- Town hall meetings.
- Videoconferencing.
- Electronic voting.
- New forms of social, cultural, recreational, and entertainment uses.

Kansas City (www.kansascity.com)

Kansas City is promoted as a state-of-the-art telecommunications hub. It is home to Sprint's world headquarters and over 150 other info-tech firms and international telecommunications companies, ranging from AT&T's regional center, KC FiberNet, TIE/communications, Accent Teleservices, American Direct, OneComm Corporation, and Southwestern Bell. From an economic development perspective, Kansas City has positioned itself as the "location of choice for global companies." It has built its information infrastructure through collaborative efforts and the cooperation of its telecommunications service providers, educational institutions, government offices, and the Chamber of Commerce.

Kansas City promotes itself extensively online, and claims to achieve over five million hits each month! It offers integrated and collective services, such as:
- Coverage of its daily newspaper, four area news stations, and professional sports teams.

- Updates on area-wide events.
- Access to the complete yellow pages.

As an example of how the community supports electronic commerce, the Greater Kansas City Chamber of Commerce provides Internet home pages for its members, allowing visitors to contact companies immediately via e-mail or fax. "Telecommunity Centers" have also been established on four area community college campuses, allowing area residents free access to the Internet and videoconferencing equipment.

Southwestern Bell has installed 1,500 miles of optical fiber throughout Kansas City for use by more than 150 local companies involved in the telecommunications industry, which helps to keep rates and services competitive. Over 90% of the central offices serving the Kansas City area offer digital switching, compared with an average of just 35% in other major metropolitan areas. It is digitally connected by fiber optics to the inner-city network of all the major common carriers. The result is a system with 20 ISDN-capable central facilities, which allows high-speed transmission of voice, data, and video over a regular copper phone line. It also offers faster Internet access, remote medical evaluations, remote classroom attendance, teleconferencing, and telecommuting.

Southwestern Bell provides businesses with fail-safe telecommunications through its SONET ring technology, which is a self-healing network that eliminates service interruptions. As a result, Kansas City is also one of Southwestern Bell's premier markets for testing and deploying new telecom technology, such as ATM (asynchronous transfer mode), SelectVideo Plus, ISDN (Integrated Services Digital Network), Voice Dial, and the Advanced Intelligent Network. This helps place Kansas City as one of the top-10 U.S. cities for home-based businesses. In fact, Kansas City was chosen by Southwestern Bell for its first Home Office Services Program largely due to its substantial small business/work-at-home market.

The Kansas City Area Development Council (KCADC) received a $250,000 grant

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from the U.S. Department of Commerce, National Telecommunications and Information Administration, to design and test a model for advanced telecommunications technologies, known as its "SmartCities Technology Plan." KCADC argues that this represents a significant boost to the community to be able to be known as the best place in the country to do business electronically. Examples include their "Personal Videoconferencing Initiative," where 30 area civic and business leaders are linked via a videoconferencing network. The system also aids in attracting business to Kansas City. Business prospects tour the city's real estate, interview local businesses, and receive presentations via videoconferencing.

"SmartCities ISDN Day" in the Kansas City area is designed to recognize the importance of advanced telecommunications in developing the economy globally, domestically, and locally. However, notwithstanding the focus on infrastructure, it is recognized as secondary to the uses and applications that it permits. Accordingly, it appears that Kansas City's strategy is that, once the infrastructure is up and running, it will develop a critical mass of use to further drive demand and generate more intensive infra- and info-structure throughout the city and region.

For example, Kansas City claims to have the most Internet home pages of any U.S. city. Additionally, over 20 area city, county, and economic development groups are now online, supporting websites, or developing home pages. To speed up the regulations process in the building industry, Kansas City area cities and counties have placed their local zoning ordinances on the Internet. However, this is deemed merely the first step toward placement of other city information on the Internet.

The Kansas City Area Development Council also undertook a "Community Showcase" to encourage the effective local use of advanced information and telecommunications technology through awareness building. The 180-delegate seminar featured national keynote speakers, demonstrated

new software, and offered new hands-on learning opportunities.

Through strategic use of media exposure, the Kansas City area is successfully positioning itself as one of the best places in the country to do business electronically. It sought out national publications, such as *USA Today*, *The Kiplinger Washington Letter*, and *Industry Week*, and the Associated Press, all of which have profiled the Kansas City area in relation to its smart city activities.

Singapore—The Intelligent Island Nation (www.singapore.com)

Asia-Pacific is the fastest growing market in the world (35% per annum) for information technology products and services. The region is still behind North America and Europe, accounting for only 24% of the world's $600 billion information technology marketplace, compared with 27% in Europe and 42% in North America. But it is closing fast, and is expected to surpass Europe by 2000. Six of the top 10 information technology exporters are from the region, producing 58% of the world's products. Singapore has positioned itself to capitalize on this growing market through its National Information Infrastructure Master Plan. Currently, Singapore has an information technology growth rate of 26%, expanding the industry from $370 million in 1983 to $5 billion in 1994.

Through its "Intelligent Island" concept of the early 1990s and focused around its IT2000 program, Singapore has become the first nation to wire every home, school, and business with an ATM broadband network. The network integrates telephone and cable infrastructure, allowing access to a wide range of multimedia services. Singapore ONE, a pilot project launched in October 1997, aims to deliver broadband services for government, business, education, and residential use. The ATM network, called 1-Net, comprises eight ATM switches, with switching capacities at 35 Gb/s (gigabits per second). The network is strategically located to cover Singapore's major population centers and interconnected by fiber optic

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cables with speeds up to 622 Mb/s (megabits per second). Currently, it serves 5,000 customers, but when fully deployed, the network will serve all business and government offices as well as 800,000 households. Singapore ONE is pivotal to creating Singapore as a smart community. It comprises two distinct but integrated components—an infrastructure of high-capacity networks and switches and the unique applications and services that run through its pipes.

The ATM network, built by an infrastructure consortium, will carry voice, data, audio, and three-dimensional video and graphics. It will be offered through at least two local access providers—Singapore Telecom utilizing asymmetrical digital subscriber line (ADSL) modems, and Singapore Cable Vision employing hybrid fiber/coaxial (HFC) connections to cable modems. It will also be available through public kiosks. As Professor Toh remarked, Singapore is well wired, but is in search for applications.[1] This is the next stage in creating the smart community of Singapore. According to the National Computer Board, the island nation is starving for new and enhanced applications. Currently, there are a tremendous number of applications online, with one new application being added per week since its launch. This growth is unprecedented. These include:

- Over 120 applications of transaction-based electronic commerce, including online shopping, property-viewing in 3D, home banking and ticketing, and other electronic purchasing.
- Internet, videoconferencing, government services, online music training, distance education learning, online courses, and Web tuition.
- News and information-on-demand services, such as an interactive multimedia entertainment magazine, library services, electronic street directories, and geo-positional guides.
- Games, educational entertainment, multi-user environments, entertainment-on-demand, and information-on-demand.

- Virtual agents for services from insurance to 3D weather forecasts.
- Virtual tours of streets and buildings, showcasing the city and its history and tourism sites.

Singapore is clearly infrastructure-rich and starving for content. But this is only a situation in transition. Singapore can be viewed as a model for smart community development. Five key factors appear to apply well to Singapore's emergence as an intelligent nation:

(1) Singapore has no real natural resources other than its people and their ingenuity and brainpower. Without a strategy that would enable them to harness this resource, Singapore would not be able to grow and compete in the fierce competitive environment of Asia-Pacific. The threat of economic demise forced the government to develop a plan that would develop the necessary infrastructure and applications. This, in turn, would promote continued demand for ever-greater use and application of telecommunications and information technologies in the community.

(2) IT2000 and its physical outcome, Singapore ONE, was the singular project that coalesced the interests of the community from development of the infrastructure to the creation of a culture of use and demand for services.

(3) Singapore's government and business leaders emerged as a coalition of champions to position the nation in the forefront of Asia's information technology revolution. The Telecommunications Authority of Singapore (TAS) was the driver of the development of the cost-effective infrastructure. The National Science and Technology Board drove the broadband research and the development of companies to create new technologies for the advanced multimedia applications and new service deliveries. The National Computer Board

The ATM network, built by an infrastructure consortium, will carry voice, data, audio, and 3D video and graphics.

spearheaded the creation and delivery of new applications and services, encouraged industry participation, and was key in support of development efforts, often acting as partners in new projects. The Economic Development Board worked to attract new business and investment and attempted to ensure the upgrade of local business capabilities. They wanted to promote online use in general, and highlight businesses with online services and applications. The Singapore Broadcasting Authority regulated and promoted the broadcasting industry in Singapore. It has been credited with creating a vibrant and dynamic hub through support and promotion of content industries such as the cultural, educational, and entertainment industries and the private sector businesses. These include multinational corporations such as Xerox, Motorola, Microsoft, Ericsson, NEC, Oracle, IBM, AT&T, Panasonic, and Hewlett Packard. These organizations and many others have become willing partners to develop and promote new applications and their use throughout Singapore.

(4) Specific community needs were identified, such as services for government, institutions, and businesses. Additionally, through pilot trials, residential uses have been surveyed and demand tested to meet the needs of its population of three million.

(5) Best practices and priorities have been investigated. Singapore researchers reviewed the best infrastructure and application development practices worldwide. With its government and private sector partners, it sought the best technologies and service approaches and most innovative content. It decided that the future of copper and coaxial cable was limited and opted to leapfrog to BISDN (broadband ISDN) technologies. It expects to have optical fiber to every home by 2005. By developing a culture of use and demand for ever-

enhanced services, Singapore has emerged as one of the most computer literate countries—30% of households have personal computers. This is comparable to computer ownership in the United States.

In the case of Singapore, the public sector clearly led this movement. It now depends on the private sector, with government and institution support, to lead Singapore into the future as a smart community. The goal is to create the high-paying, value-added knowledge and advanced technology-intensive jobs that will, in turn, foster demand.

Conclusion

There are many other smart communities worldwide that should be recognized for their unique and valuable contributions. There are likely thousands of communities which have discovered that, by marketing their communities as "smart," they are able to attract businesses, especially multinationals in developing countries, and the interest of site location consultants. However, with the marketing of a smart community must come the substance backing it. The list in Table 1 is not exhaustive, but it will provide a sampling of the wealth of opportunities that have been made available in communities for economic and social growth and prosperity that a digitally-inclined and content- rich environment can provide—if the community is willing to harness it. NTO

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[1] See part one of this article, John G. Jung, "Smart Communities:" Digitally-Inclined and Content-Rich," *New Telecom Quarterly*, Vol. 6, No. 1 (February 1998):19-26.

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Table 1
Examples of Smart Communities

Community	Partners	Focus	Projects	Contact
Baltimore, MD	City and State Departments of Education	Educational	SAILOR: Educational on-line public information network	www.lib.md.us/mdlibs/ mdlibs.html
Blacksburg, VA	Electronic Network, Blacksburg Electronic Village	Information access, permit processing, library services, community networks	National beta test community; online government and business services	www.bev.net government/ www.bev.net/library index.html crusher.bev.net/index. html
Calgary, Alberta	Calgary Free-Net, CEDA, CRDA, CCVB, CTA, Calgary Chamber of Commerce Web Consortia, Infoport, NowTV (WebTV)	Community networks; community use and application development: health sciences, R&D, economic development	Internet consortia of economic development and promotional agencies, Infoport	www.ceda.calgary.ab.ca freenet.calgary.ab.ca telnet: freenet.calgary.ab. ca; login:guest
Cambridge, MA	Continental Cablevision provides city-wide data networking and Internet access over its cable system	Distance education, training, and job markets	Massachusetts academic and high-technology communities market via Internet	www.ai.mit.edu/projects/ iiip/Cambridge/city. hall.html
Chicago, IL	Chicago Alternative Policing Strategy	Policing and government services	Online police and community support services, smart voting	www.vote-smart.org tezcat.com/web/chica go.html
Cleveland, OH	Cleveland Free-Net	Community networks, education communities online	Cleveland directory, community-based computer networks	telnet: freenet-in-a.cwru. edu; login:visitor telnet: freenet-in-b. cwru.edu
Davis, CA	Davis Community Network	Small business, government forums, input into planning process, community networks	Web services to small business	www.city.davis.ca.us www.dcn.davis.ca.us
Glendale, CA	LNX System	Library services	Online library	38.254.16.3/glendale/ library/index.html
Edmonton, Alberta	Smart City, FreeNet, City Council, and Economic Development Edmonton	Community networks, city-wide applications	Edmonton Smart City	telnet: freenet.edmonton. ab.ca; login:guest

Table 1 (continued)
Examples of Smart Communities

Community	Partners	Focus	Projects	Contact
Fredericton, New Brunswick	New Brunswick's Innovation Network	Community-wide and government services	Connect NB: online services, mapping transportation, tested broadband applications	itjobnet.gov.nb.ca cnet.unb.ca/connectnb www.intergov.gc.ca catalogue/index.html nbinfohwy@gov.nb.ca
Kansas City	Kansas City Area Development Corporation	Online destination for economic development	Beta test city	mt.edu:8001/people dserda /kcstuff.html 1-800-SMART KC. kcadc@smartkc.com www.kansascity.com
Ottawa, Ontario	Carleton University Board of Education, the City of Ottawa, federal government departments, provincial government, Gandalf Canada Ltd., and Sun Microsystems of Canada	Encourage community organizations to communicate with the public, revitalize community involvement	National Capital Free-Net, 18 public access terminals in public libraries, in city hall, and other government offices	freenet.carleton.ca/ freeport/freenet/ conference2/is sues/menu
Palo Alto, CA	Plugged in	Community networks, tourism information via Internet, police services, and community safety	Online services	www.city.palo-alto.ca .us/ home.html www.pluggedin.org gatekeeper.city.palo-alto.ca.us:80/palo/city/ citygov/police/home.html
San Diego, CA	San Diego Data Processing Corporation, International Center for Communications	City-wide applications and educational focus, World Forum for Smart Communities	*Guidebook for Building Smart Communities* and *Implementation Guide for Smart Communities*, Smart Communities World Forum	www.smartcommunities. org, (619)594-4212 or by e-mail at dsimmons@ foundation.sdsu.edu. rohan.sdsu.edu/ infosandiego/examples/ citygov/index.html
Seattle, WA	Seattle Community Network (SCN), Seattle Emerald City non-profit, Seattle Crisis	Health services, police services	Two-way voice, data, video and multimedia communication capabilities to all residents, businesses, and institutions	www.seattle.net www.pan.ci.seattle.wa.us
Silicon Valley, CA	Public Access Link, Smart Valley, Silicon Valley Joint Venture, CommerceNet (industry association)	Community networks, community-wide applications	CommerceNet, government services, GLOBE project	www.svpal.org www.abag.ca.gov/bayarea/ commerce/globe/globe _ -intro.html www.abag.ca.gov/bayarea/ eqmaps/eqmaps.html www.commerce.net

Source: John G. Jung