

# SITUATION ANALYSIS INVENTORY

SmartCommunities™ Project

Examining the economic, social, political, and  
educational dynamics of communities in the coming

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Final

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## PREFACE

This document is intended to help establish a vision framework for community transformation meant to be provocative, not definitive. It is neither a comprehensive review of research nor an attempt to "prove" assertions about the possibilities awaiting communities. However, it is time to think strategically and for communities to consider pathways to transformation and acting on them. This does not mean that this document lacks any evidence to support assessments of current conditions and future opportunities. Precisely the opposite: research and experience with developing Information Age tools suggests that if communities act until the vision is perfectly clear and the risks have vanished, the opportunities will be well.

The goal of this document is to identify and describe the context of existing smart communities involved in and relating to economic competitiveness. The inputs to this study consist of a survey and various interviews with selected project managers. The surveys looked at goals, implementation processes, financing, technology, staffing, community demographics, communication capabilities, and other distinct project factors. The results have been used to determine the best practices for development of a "SmartCommunity".

Section 1:

# SITUATION ANALYSIS

SmartCommunities" Project

## INTRODUCTION

Implementing "SmartCommunities" necessitates a realignment to the demands of the Information Age. However, this realignment requires more than just the increasing use of information technology. Many organizations have merely superimposed a silicon veneer onto outmoded Industrial Age systems, techniques, and organizational cultures. Then they puzzle why gains in productivity and competitiveness prove elusive. Realignment to the imperatives of the Information Age requires an assessment of how the needs of one's stakeholders, clients, customers, and beneficiaries have changed in the Information Age. Guided by this understanding, communities can determine what must change their structures, roles, and functions to serve those needs. Every community that has developed such a vision for the Information Age has realized the necessity for further change and realignment.

The following discussion of possible implementation models should not be construed as a prescription. The intent is to suggest scenarios that will lead to new approaches. In fact, it is the research conducted so far, that a flexible and dynamic approach is highly preferred. One of the following methods for introducing change into a community has a weak spot. For example, a supply-driven model, described below, might lack the grass-roots support that is necessary for a transformation. Similarly, the demand-driven model may not be able to bring sufficient change to have a wide enough impact. The challenge for a community is to find a balanced approach.

## Strategic Implementations

### SUPPLY-DRIVEN (PUSH) APPROACH

As communities approach the shift to the Information Age, a key lesson is that understanding the forces that can both enable and push the transition into the new economy and new ways of working. In the Industrial Age, the steam engine, the internal combustion engine, and the jet engine were the leading technological developments. For the transition to the Information Age, the emergence of computing, the fusion of telecommunications with computers, and the emergence of ubiquitous networking are the leading technological developments. For example, in an Executive Order issued on Sept. 15<sup>th</sup>, 1993, President Clinton established the National Information Infrastructure (NII) to assist the Department of Commerce on national strategies including developing and demonstrating applications such as electronic commerce, agile manufacturing, life-long learning, health care, government, and civic networking. The President defines the NII as "the integration of hardware, software, and services that will make it easy and affordable to connect people with each other, with companies, and with a vast array of services and information resources."

### DEMAND-DRIVEN (PULL) APPROACH

In contrast to the discussion of the push model, the pull model seeks to first address demand. By this way of thinking, demand is a leading indicator of where and how a community will transform. In the Industrial Age of the early 1900s, the need to calculate the payroll quickly and reliably prompted the development of new tabulating machines which became electro-mechanical computers. This ultimately drove manufacturers to develop the mainframe computer. Similarly, when companies find it more profitable for their employees to work in a community, then demand for alternative work facilities increase within the community. The community seeks to fill this niche, and resources such as infrastructure are made available. The community transforms the landscape of the community into new forms as people demand new services and ways of accessing old services. For the transition to the Information Age, the need for a way to communicate anywhere, anytime is pulling the telecommunications industry to develop new services.

<sup>1</sup> Michael G. Dolence and Donald M. Norris, "Transforming Higher Education: A Vision for Learning in the 21st Century," College and University Planning, 1995

<sup>2</sup> Richard Cville, Miles Fidelman, John Altobello, "A National Strategy for Civic Networking: A Vision of Change,"

applications using the Internet and delivering information on-demand. In particular, Information User Survey focus groups identified several favorites:

Most people were found to rate entertainment concepts highest. Specifics include demand, television shows on demand, interactive game shows, and viewer-controlled camera angles during sporting or other events. Despite the potential appeal of entertainment, it is still to be proven that people will pay monthly fees to access. Interactive educational programming for adults and children consistently ranks second in popularity after entertainment. Although people often overstate their interest in these options, home workers and others are interested in the convenience and possible cost savings of accessing adult education and training at home. Meanwhile, parents in all economic classes express solid interest in interactive educational services for their children, and many believe that interactive TV provides a better baby-sitter than TV.

Interest in electronic banking is nearly on a par with interest in entertainment. Critical to the ability to electronically transfer funds is the need for effective security techniques, promised by several vendors this year. Even more exciting is the potential for digital cash, the equivalent of having a debit-card account on a home computer or, in the future, on interactive TVs and portable communicators. Here, the debate is whether such cash should be made traceable, as preferred by law enforcement and government tax officials, or whether it should be preferred by privacy advocates. But the technology is already available from a company called Digicash.

Some individuals are also interested in the ability to run appliances when utility bills are due or to check utility accounts and set back thermostats when consumption threatens the budget. Some of these capabilities are already moving into testbeds, most notably in a program underway among Pacific Gas & Electric Company, TCI, and Microsoft in California.

Demand-driven strategies for SmartCommunities" start with an interest in exploring ways of meeting the needs of a community that challenge conventional ideas of where, when, and how knowledge-based economy works. Creating new infrastructure is typically not a primary consideration. When developing demand-driven strategies, the question is, "Does the community respond to a specifically identified need?"

## DEVELOPING THE COLLABORATORY

It is a fact of life that technology efforts tend to be capital-intensive and this is why many communities choose not to move towards the SmartCommunities concept. A few "Lucky Ones" can depend on the private sector to lead them into complete electronic infrastructure. In the case of Palo Alto-based Smart Valley, Inc.

Largely led by computer manufacturer Hewlett-Packard, SVI formed a consortium of dozen technology companies based in the San Francisco Bay area. SVI grew out of Joint Venture Valley Network, a grass roots effort to generate ideas for creating balanced economic growth and increasing the quality of life in Silicon Valley. In 1993, Smart Valley, Inc. was incorporated as a 501(c)(6) non-profit organization to develop an advanced information infrastructure. SVI maintains a full-time staff and is led by a Board of Directors and has a \$1.3 million budget.

Projects of SVI focused on delivering benefits to the entire community, not just to the wealthy. The most positive impacts of these efforts have resulted in the progress towards:

- ◆ Revitalizing education
- ◆ Addressing health care cost and quality

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<sup>3</sup> Not coincidentally, personal computer sales surpassed those of color TVs for the first time last year.

<sup>4</sup> This service can be tried on the Internet at <http://www.digicash.com/>

<sup>5</sup> Thomas E. Miller, New Markets for Information, April 1995, American Demographics, Inc. Professor Pradeep Chirba, an assistant professor of marketing at the Johnson Graduate School of Management at Cornell University, helped direct this effort.

- ◆ Making local government more responsive
- ◆ Connecting members of the community together
- ◆ Retaining business in the community
- ◆ Creating new jobs

Still, most communities are not as "lucky" and must rely on key leaders to move and create collaboratories and leverage resources. Successful collaboratories generally governmental, educational and business/industrial establishments together in a mutual and beneficial manner.

San Diego: City of the Future demonstrates how the diverse components of a community brought together to leverage the necessary resources. In that effort, the San Diego University's International Center for Communications conducted several studies exploring of communications technologies for local communities. The reports caught the attention of San Diego's mayor, Susan Golding who as a result moved to create an initiative that would tap San Diego's potential as the telecommunications center of the new North American Command and secure for all citizens of the city the benefits of access to the developing optical highway. Acting on her belief that there existed in the city the political will to bring education and industry joining forces in the community to transform San Diego into an international information city, Golding created the Mayor's Advisory Committee on the City of the Future. To date, there are currently in the works a number of component projects to create a full-service regional information infrastructure. For example, the City Department of Information Services is teaming with Maxwell Labs and AT&T to install kiosk-based community information servers around the region. Additionally, the City executive committee has issued an RFP to solicit strategic partnerships for the development and operation of advanced telecommunications network services for the San Diego/Baja Region. The proposals are currently under review by the City of the Future committee and a contract will be awarded in late 1996.

#### USING COMMUNITY NETWORKS AS A STRATEGY TO CREATE A SMART COMMUNITY

Community networking is known by many names -- community-based computer networks, community computing, community telecomputing, community bulletin boards, civic networking, telecommunity systems and community information systems. A resident of a town or city accesses the community network by dialing into a central computer with their personal computer a series of menus appears on the screen and the user selects the information or community services they would like. They pick up information provided by city hall, a business provider, participate in a public discussion on a local issue with others in the community via e-mail with others in the community. The community similarly named "on-line communities" or "virtual communities", community networks are based in a physical place and participants have in common are their cities and neighborhoods. Although every community is unique, they all share three characteristics (in addition to the basics of providing information and a means to communicate electronically) that distinguish them from other commercial networks and bulletin boards.

1. Local. The most distinguishing characteristic of community networks is their focus on the local. They emphasize local culture, local relevance, local pride, and community ownership.

<sup>6</sup> International Center for Communications. San Diego: City of the Future, The Role of Telecommunications. March 1996.

<sup>7</sup> International Center for Communications. 1996. San Diego City of the Future. Available WWW: <http://rohan.sdsu.edu/dept/intlcomm/CityofFuture.html>.

<sup>8</sup> Morino, Mario. 1994. Assessment and Evolution of Community Networking. Ties That Bind Conference, May 4-6, 1994, Cupertino CA.

<sup>9</sup> Guthrie, Kendall, Joe Schmitz, Daehee Ryu, John Harris, Everett Rogers and William Dutton. 1990. Communicative Participation: The PEN System in Santa Monica. Computers and the Quality of Life, Washington DC, September. Association for Computing Machinery, 104.

<sup>10</sup> Morino, 1994.

2. Access. The second feature that distinguishes community networks from commercial and bulletin boards is their concern and effort to ensure that the network reflects members of the community and not just traditional computer and telecommunication means that community networks are frequently involved in placing computer equipment in accessible places such as community centers and libraries.
3. Social Change/Community Development. Community networks' third characteristic is that the system with its communication and information can strengthen and vitalize communities. Community networks are frequently seen by their organizers as a tool different from tools such as printers, photocopiers, telephones, radio or television used for community organizing in the past. It is believed that community networks help the local community to find and build solutions<sup>11</sup> to their problems.

Many community networks can be (and have been) a catalyst organization for communities becoming smart. Community networks have worked extensively one-on-one with key leaders in sectors of the community to educate them and help them be comfortable with technology. They usually have strong connections to universities, which provides the necessary technical and financial support. Community networks usually have strong connections to universities, which provides the necessary technical people who have the motivation and the freedom to tinker around with technology that wouldn't be profitable to business, especially in the early stages. Community networks evangelize in the community, and often offer no-risk ways for organizations to get free or extremely low cost access. (The reason they can do this is because they are and they are usually subsidized). The most successful community network projects in sectors of the community (and as a beneficial unintended side effect, result in cooperative efforts to tackle and resolve problems where segment-isolated attempts at some of these problems not even having anything to do with telecommunications).

Most successful community networks operate on the incubation model. They tend to be organizations that are interested in recruiting and growing individuals as computer information technology and electronic communication tools, and then letting them grow independently, usually to the private sector. For example, the Davis Community Network was an experimental project conducted by the University of California at Davis under contract to the California Department of Transportation (Caltrans). DCN quickly grew beyond its client control was eventually transferred to the Davis community itself.

An examination of the DCN experience provides specific ways in which community networks can contribute to the development of an environment in which a smart community might

- ◆ Community networks can facilitate the simultaneous adoption of the use of electronic information and communication tools by key individuals in all of the domains of a community's institutional infrastructure. This deliberate, targeted approach can elevate the sophistication of the entire institution and cause cascading institutional infrastructure. For example, in the Davis Community Network project, all three domains of the local institutional infrastructure were targeted at the same time - elected officials, citizens - for a project on the use of electronic communications tools in the city planning process. In part because those key stakeholders thus had personal experience with the use of electronic information and communication tools, the necessary sustained pressures for change from all the stakeholders were achieved, and the general result was a major transformation in policies, procedures, and resource allocation priorities. As a consequence, the new City of Davis general plan reflects a new understanding of what infrastructure means (giving preference to new residential and commercial developments that include the infrastructure components necessary to support modern communication technologies, and requiring that proposed city construction projects are reviewed to extend networking infrastructure); commits resources to the use of electronic information tools for more effective government and citizen participation in government; and telecommunication planning as a desirable form of transportation planning to improve personal convenience and reduce dependence on non-renewable resources.

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<sup>11</sup> Beamish, Ann. Communities On-Line: Community-based Computer Networks. Thesis. Massachusetts Institute of Technology, February 1995.

- ◆ Community network expert technical volunteers often have higher credibility with sector staff and elected officials than do representatives of private companies, can be more effective as change agents in large government institutions if the v activities are planned and coordinated. For example, in the City of Davis, the network project staff and volunteers worked with the MIS staff to develop a new network plan. This plan provided for the internal technical infrastructure (cor software, network connections, servers, etc.) necessary for city staff and elect the ubiquitous access to high-speed networking and communication tools that are transform how the city does business. At the same time, other non-technical con worked with individual city council members to demonstrate the power of such too consequence, in a time of tight budgets and layoffs, the implementation of the was supported so strongly that an investment of over \$300,000 was approved by t The same approach was used with the local school district, with the result again networking plan was developed, and implementation is beginning with four schools line in 1996.
- ◆ Because of the community focus, community network projects can leverage activiti many different community organizations, to achieve together what each could not separately. For example, the Davis Community Network is working with schools, county government, small businesses and local non-profits to provide a coordinat staffed public access sites. This public access program is actually many other woven together and leveraged by the DCN - for example, equipment for the public is being obtained by various means, including donations of obsolete equipment f university and city government, multiple uses of lab equipment (city and school) supporting ÓfriendsÓ organizations (e.g., ÓFriends of the LibraryÓ), small grant to be achieved through volunteers managed by the Davis Community Network.
- ◆ Community networks can be loci for consensus building among very diverse groups communication is properly moderated and facilitated. For example, the DCN Water project provided electronic mail and Internet access for all California agencies (whether public, private, or citizen-based environmental activists) that deal wi California. This potentially very contentious arena was supervised and moderate who was a consultant with significant experience in community facilitation and building. Among other achievements, the project participants arrived at a remain consensus that information freely shared was actually more valuable in arriving beneficial solutions than information locked away in difficult-to-obtain reports consequence, public and private water agencies and environmental organizations have begun to make major investments and institutional policy changes which are explosion in the quality and quantity of water-related data which is available being used in policy analysis and discussion.
- ◆ By reducing social isolation and providing a shared communication environment, community networks can Óimprove the quality of life in many ways for members of disadvantaged or marginalized groups,Ó especially older adults and disabled indi Blacksburg, Virginia, the Blacksburg Electronic Village supports a very active o population, with electronic mailing lists, discussion groups and other communica allow seniors to stay socially active.
- ◆ Community networks can facilitate the formation, restructuring and collaboration organizations necessary for community transformation. When community network pr work with many different community organizations at once, and if the projects ar their assessment of community needs, they can identify common communication and needs, financial and other resources, and develop creative solutions to meet th leverage the resources. For example, the Davis Community Network is assessing t communication and information needs of community-based volunteer organizations ( are included - those who deliver social services, and those who provide sports a activities for the youth of the community). Many common needs have been identi proposal is moving forward (coincident with planning for a large community recre community communications center which will meet those needs. Examples of other

network projects which are working to make these types of organizational connect LatinoNet and Playing to Win.

- ◆ Because many community networks strive to be representative of their community, can provide the necessary tools, technical and institutional infrastructure, and to promote the development of deep, rich, organized and locally-representative information content by volunteers. Most community networks have classes for information providers encourage members to be self-sufficient information providers as well as information and provide an organizing structure into which such content can be plugged in. Community networks can weave together many disparate information sources into a usable body of information. For example, the Blacksburg Electronic Village support Care Center, where locally relevant medical information is available, as is information medical databases, local hospitals, health services, and support groups.
- ◆ In particular, community networks are in a unique position to promote projects which involve more efficient delivery of local and federal government services and increase public awareness and participation in government processes. Some excellent examples these can be seen at the Association of Bay Area Governments (ABAG) web site ([http://www.abag.ca.gov/abag/local\\_gov/examples.html](http://www.abag.ca.gov/abag/local_gov/examples.html)).
- ◆ Community networks can aggregate markets and can serve as testbeds for new applications, products and services., creating new markets for private industry and extend. For example, before Internet access became a commodity, many community networks provided Internet access in university communities for non-university-a community members, and in rural communities. Often within a year of such service by the non-profit community, small local businesses (even in rural areas) started similar services. Some of these were partners to community networking efforts; competitors. To some extent, it can be argued that the community networks help markets. The community network based in Tallahassee, Florida (Tallahassee Free this experience.
- ◆ Community network projects can serve as brokers and community advocates for the provisioning of a wide range of technology infrastructure. In the current volatile competitive environment, the big players in the industry - phone, cable and broadband companies - are jockeying for position. In this competitive environment, community projects can work on both a large and small scale to bring the big players together collaborative projects. The desired outcome from a community network point of view connectivity choices for the community - from public access sites, to modems, to television, to wireless - with the appropriate technology matched to the application. In addition, community networks can serve as advocates for the development of technology infrastructure in communities and sectors of communities which will not necessarily by competition alone, especially in rural and poor communities. An example of this partnering can be found in the Net at Two Rivers project, where small local Internet providers are being subsidized through subscriber rebates, (funded by an NTIA Title order to get these services into rural areas which will not otherwise be well-served development of the market (if economic development ever occurs).

## SUCCESS FACTORS

What are the factors that are required to enable the development of a SmartCommunity articulated list of factors might imply that there is a particular order to their implementation. This is not true. In fact, most communities will find themselves in possession more of these factors and will be looking to add the remaining ones. This is an inherent process. How a community leverages its resources to transform itself is dependent upon economic, social and technical situation. The first step is to assess the community work from there. This discovery process will result in a clearer conception of the

unique DNA. In turn, this will determine the range of potential next steps that can acquire the missing factors.

## STRATEGIC CONSIDERATIONS

The first temptation is to break apart the SmartCommunity" into its constituent components and look at each element under a microscope to understand the details of how it works. This decomposition is a classic, scientific approach which strives to make a highly complex system tractable. Communities then try to reassemble this myriad of facts into a single mechanism, but it is that it causes the community to lose sight of the greater whole, the bigger picture. The workings of the community and how individuals and organizations interact with each other become lost. As physicist David Bohm says, the task is futile - similar to trying to reassemble a broken mirror to see the true reflection.

In the analysis of the nature and behavior of a SmartCommunity", it is clear that it cannot be understood by dissecting the underlying community. Instead, it is seen most clearly as a SmartCommunity as an integrated whole, in a thoughtful and coherent manner. The SmartCommunity is a system, where the members of the community are bound by invisible cords, like a spider web. Often, the positive effect that any one cord has on the well-being of the community is overlooked. Since the members of the community are part of the web, it is difficult to see how necessary to transform the community. Instead, people tend to focus on micro issues that are easier to grapple with, and then complain because the deepest problems never seem to be solved.

Instead, what is needed is a conceptual framework, a body of knowledge, and a set of principles to make the patterns of a SmartCommunity" clearer. From this, a plan for action can be developed. This then allows the intrinsic worth of the connections between resources to be enjoyed and leveraged by the entire community. The SmartCommunity", then, is one where new and innovative ideas are nurtured, where collective as well as individual needs are being met, and where people are continually learning how to live, work, play, govern, move, and learn together.

Developing the Framework: The Integrative Technology Model/Readiness Gauge  
Technologies are often touted as instruments of fundamental change. Supporters of diffusion throughout complex systems - whether education, healthcare, or government working toward beneficial system-wide transformation, rather than incremental change. The resulting changes are system-wide, and sometimes not. Sometimes the resulting changes are desirable and planned; sometimes there are unintended side effects which are perceived as negative.

Certainly, the telephone is an example of a technology tool which resulted in fundamental, wide changes in the way in which people communicated. Computer and communication technologies have caused system-wide changes in business - but not yet in education, which is more resistant as it has been since the industrial revolution - with a teacher standing in front of a class. The automobile is another technology which resulted in fundamental, systemic change - not only in how people traveled, but also in how cities, residences, businesses and public places were built. In addition, human activities were altered in a fundamental way, affecting mobility, and how they lived, worked and played. Some city planners also ascribe some of the negative aspects of modern civilization to the automobile, including isolation, inner city decay, suburban sprawl, and the loss of traditionally important cultural centers.

The Davis Community Network has developed an Integrative Technology Model to look at the impact of wide changes in not one but many complex systems (all those systems which make up a "community"), the UCD project team developed a model for evaluating the feasibility of changes on that basis. The model is designed for two purposes:

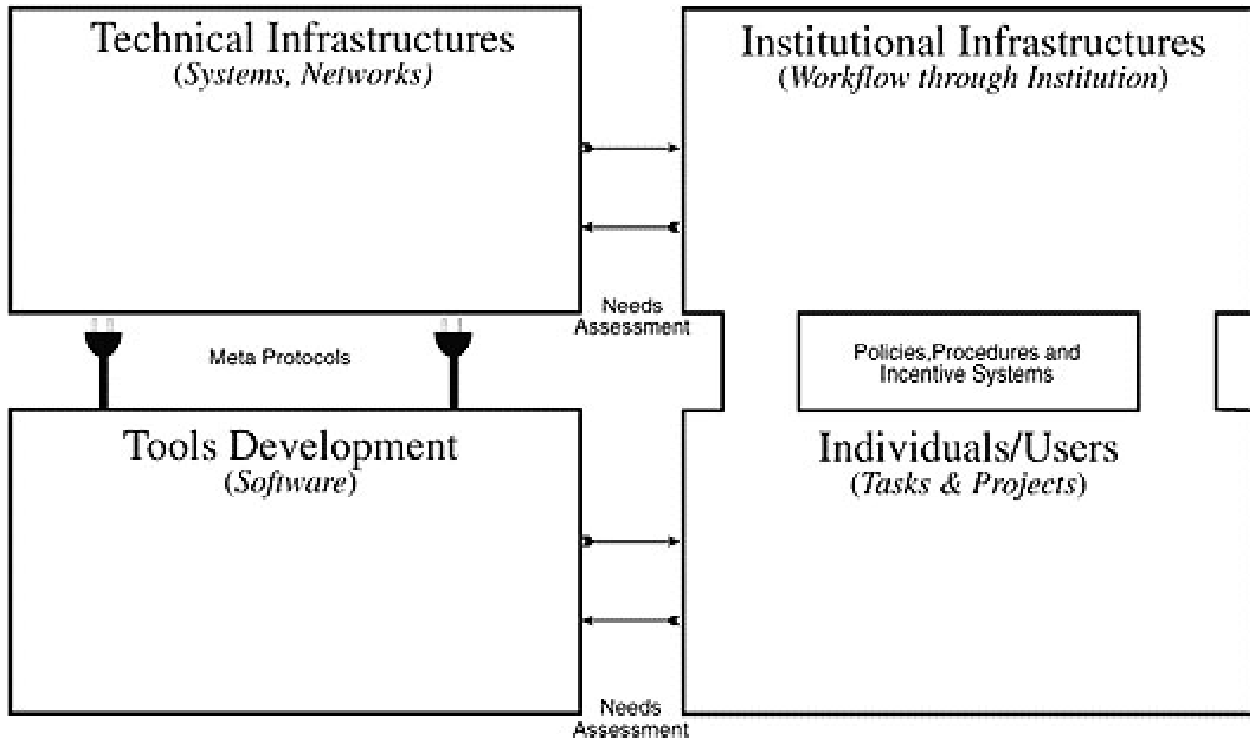
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<sup>12</sup> A term coined by Kevin Starr to describe the unique characteristics that describe the nature and qualities of a SmartCommunity.

<sup>13</sup> Davis Community Network. 1996. Detailed Caltrans Project Report. Available WWW: <http://www.dcn.davis.ca.us/DCN/Research/Contents/2.0/2.3.0.0.0.html>

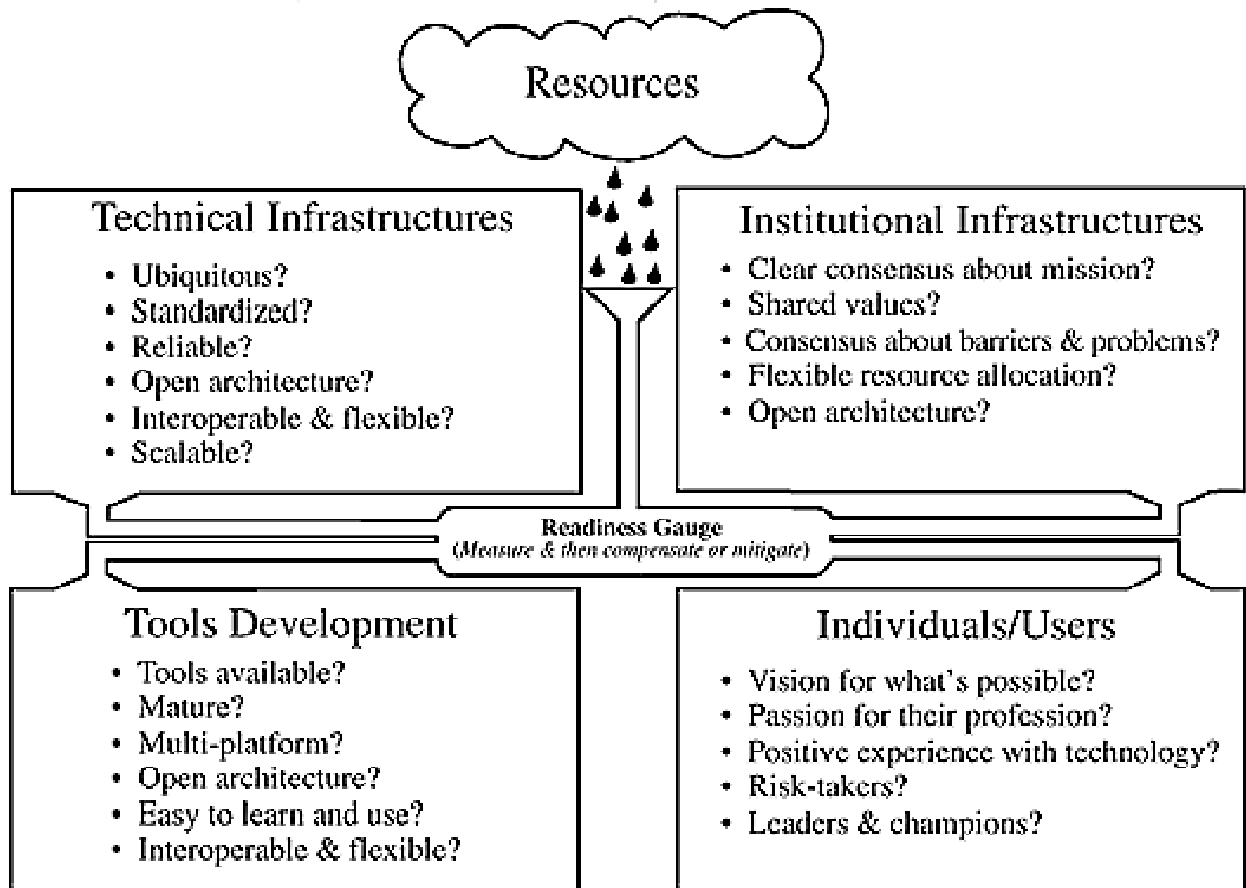
1. to assess the potential systemwide effect of a technology project on all the complex system, by looking at the change - readiness states of each; and
2. to provide a framework for predicting unintended side effects of the technology

## Integrative Technology Model (Thresholds for System Transformation)



From this model, UCD then created a readiness gauge, which is useful to planners w/ considering building their own community information network:

## Integrative Technology Readiness Gauge



Using the Readiness Gauge to evaluate the projects in the appendices, it is clear that complex initiatives; such as Blacksburg Electronic Village, Davis Community Network Valley, Inc., fared much better than the smaller Free-Net type projects. The obvious planners of the larger initiatives looked to provide a multi-service utility, rather than developing web pages or simply providing email service. In addition, the larger projects sought to transform their communities and use information technology to enhance their local economies. Smaller project managers simply wanted to provide a service that would allow the community to communicate on-line.

## Assembling a Body of Knowledge: The SmartCommunity Project Inventory

### A Framework for Classification

The SmartCommunities team designed an inventory survey based on a tool developed by Guthrie and William Dutton to analyze four city-wide networks in southern California. They classified networks by describing:

1. the design of the network (i.e. the technical and policy decisions made), and
2. the factors which led to that design.

### Network Design

Though community networks and other information technology projects often have similar technological choices made when designing the system have a strong influence on what network, how they use it, and to what purpose. The choice made by designers is not free. Technological and policy choices that shape a community network include:

- System capacity (memory and the number of simultaneous users it can support);
- Accessibility (number of public terminals and cost of private terminals);
- Information content (commercial vs. non-commercial);
- Editorial control (complete control vs. a common carrier system);
- Ownership (private, public, nonprofit, or a combination), and;
- Financing (public, commercial, subscription)

### Factors That Influence System Design

Guthrie and Dutton also believe that there are five factors that strongly influence design and policy decisions. They are:

- ◆ **Technical History.** The choice of the type of technological model often comes directly from the model with which the designers are most familiar and is based on the background and professional training of the designers.
- ◆ **Political Culture.** Three of the most important aspects of the political culture are political ideology, citizens' expectations of local government, and the level of participation. These aspects strongly influence who owns the system and how it is managed.
- ◆ **Economic Factors.** The economic climate of the community plays an important role in determining the priority that the community places on economic considerations. Not surprisingly, economic factors are often strongly connected with the political culture.
- ◆ **Interest Group Politics.** Interest groups that can affect the design of the system include the business community, social service providers, the school district, the real estate industry, and the health industry.
- ◆ **Community Involvement.** The inclusion or exclusion of community involvement can make a significant difference in how the network is designed and operated.

## Framework for Inventory Analysis

The framework proposed by Guthrie and Dutton offers a solid base from which to compare and analyze community networks. However, there are additional useful questions that we can ask in a survey, such as:

- Who were the individuals, organizations or institutions who started the network?
- What were their original goals or objectives?
- Where did their initial funding and support come from?
- How is the network staffed?
- How do they deal with issues of access, continuity of support, sources of information, volunteer staff, funding, etc. ?

The structure of the interview and the data can be found in the appendix to this report. Generally the SmartCommunity Inventory process found that community networking projects can be classified according to community network types.

- Free-Nets,
- bulletin boards,
- government-sponsored networks, and
- wired cities.

Ann Beamish provides an excellent description and analysis of these categories and can be a useful tool for the reader in comparing community networks. However, the projects the SmartCommunities project team interviewed can (and probably will) have overlapping membership. For example, the Glendale Community Network is a government-sponsored network but was also built as a bulletin board system. In spite of occasional overlaps the four groups can be distinguished by their stated mission and who initiated and maintains the network.

### 1. Free-Nets and the NPTN

The word Free-Net is often used as a generic term for community networks but in fact refers to a specific type of network. Free-Nets are members of the National Public Telecomputing Network (NPTN) and follow their policies and procedures. They also frequently use the Free-Net software developed at Case Western Reserve University for the Cleveland Free-Net. As the NPTN is a non-profit, Free-Nets are "loosely organized, community-based, volunteer-managed electronic information services. They provide local and global information sharing and discussion at no charge to the user or patron." <sup>14</sup> In addition to the efforts of the NPTN, Free-Nets are some of the most organized community systems and the Free-Net model is one of the most widespread. The NPTN, a non-profit corporation, was established in 1989 to disseminate the software and methods for establishing community networks.

### 2. Neighborhood or City Bulletin Boards

A second model for community networks, of which there are few examples, is the small bulletin board which usually focuses on a particular neighborhood rather than a city. These systems (BBSs) are frequently scaled-down versions of city networks and can either be independent systems or parts of larger city-wide networks. They are usually established by an individual or a small group from their home with a modest investment in hardware and software, or they can be established by a small group of community activists. Neighborhood BBSs focus on an even more local focus on information and discussion and emphasize community development; they have the advantage of being highly accessible and easy to use.

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<sup>14</sup> Beamish, 1995.

<sup>15</sup> Victoria Free-Net Association. 1994. "Free-Net Strategic and Marketing Plan." Available WWW: <http://freenet.vic.gov.au/freenet/conference2/issues/menu>.

participants often know each other personally. Their disadvantages are that the system often depends on a single individual, the resource is isolated from other similar systems based on proprietary software. An example is the Glendale LNX system and the approach in Diamond Bar, California.

### 3. Government-Sponsored Networks

A third type of community network is the city-wide network sponsored by state or local government. The primary purpose of these systems is to make city records and municipal information available to residents. One of the first electronic systems sponsored by a city government was the Public Electronic Network (PEN). It started in 1989 and is only open to those who live in Santa Monica. The purpose of PEN is to provide electronic access to public information, provide an alternative means of communication to convey their needs, preferences, and intentions to city government, provide electronic forums to enhance the sense of community, and help residents learn about computers and communication technology. Residents can access the system through read-only boards with information provided by city government, private e-mail between city hall and residents, or public postings in conferences on a wide range of topics. Of the older systems, PEN has faced a number of issues during its development. One of the major problems has been to create a system that people would value and use. Another difficulty was the internal resistance of several departments in the municipal government that did not want to be accessible to the public. The PEN system did, however, have important support from the city librarian, the police chief, and a number of council members which resulted in the development of the system.<sup>16</sup>

### 4. Wired Cities

The final model is that of the wired city. The term wired city is used in the literature to describe the view of a future community in which all kinds of electronic communication services are available to households and businesses. San Diego, with its "City of the Future" initiative, is pursuing this approach. The approach is not to create a single utility that supports the entire local information network, but to create an atmosphere which would encourage technological development and public-private partnerships. To this end, the San Diego initiative is a patchwork of projects that create a network of services. To date, San Diego is developing a Community Health Information Network (CHIN) with the cooperation of area medical service providers; a kiosk-based information system in the direction of the County of San Diego (partnered with AT&T and Maxwell Labs); and a program reviewing RFPs seeking strategic partnerships for design, construction, implementation, and maintenance of advanced telecommunications network services for the San Diego/Baja Region.

A wired city also refers to any large-scale experiment or project that involves providing public and communication technology services. Examples include Blacksburg Electronic Village (Blacksburg, VA) and Davis Community Network (Davis, CA). Both examples resulted from public-private based experiments aimed at offering on-line services to a local community. In both cases, the experiment proved to be overwhelmingly successful, and the projects moved from the experimental stage to real life smart communities. However, the Blacksburg Electronic Village, is unique in that it is the first community network that is actively pursuing the goal of building network services to every home, business and classroom. BEV organizers still see the project as an opportunity for local businesses to test new products and delivery mechanisms to the residents of Blacksburg. The system is still quite new, but to date, it is almost exclusively a supplier of information services to Blacksburg, area businesses, clubs, events, education, health services and the library. The local government supplies the phone number of local city departments. Unfortunately, there is no place for public discussion or public debate. The communication side connects people, but there are no groups for discussing local issues. The literature on BEV indicates that this will be incorporated into the system in the future. They state that the Blacksburg Electronic Village can serve as a foundation of an ongoing "Electronic Town Hall"

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<sup>16</sup> Kirschner, Bruce. 1994. "PEN Lessons: An Interview With Ken Phillips." Public Management. (December 1994): 1

communicate with each other and with town leaders informally by electronic mail to service and community improvement projects.

### Tools Development: Finding and Leveraging Resources

While establishing a simple (email, BBS) community network may be one way to begin the Smart Community concept, our survey generally found that these systems, once not find it desirable (or even necessary) to do more much else beyond proving such. One reason that these projects were not interested in expanding was simple economic projects were generally low cost and required little overhead. These systems also heavily on corporate and government donations and volunteer labor. Volunteer labor community networks since almost everything that appears on the network is put there or organizations in the community who contribute their time, effort, and expertise information and maintain the<sup>18</sup> system.

Some of the more complex initiatives, (Blacksburg Electronic Village, San Diego: C Net at Two Rivers, Davis Community Network), were implemented with funds and resources from both the public and the private sector. The exception is Smart Valley, Inc., which is supported by the local high-technology industry. The others created public-private example, San Diego: City of the Future created several task forces that each had a representation to conduct feasibility studies. The effect was not only a well-represented but the active participation by the task force members (and the institutions/establishments represented).

The advanced initiatives also relied on a large body of public input to achieve. City of the Future created an InfoSanDiego on-line forum<sup>19</sup>. The Davis Community Network provides a sponsored project process which provides resources (accounts, individuals or institutions with creative or innovative ideas about how to use information to meet their needs. It appears that public input has been an important and necessary part of the development of an SmartCommunity--use of these tools is an example of the implementation of the demand-driven or pull approach that was described earlier.

### CONCLUSION

The main conclusion of that can be made from this analysis is that there is no single "SmartCommunity" solution for every situation. There is no single best practice to implement "SmartCommunity". Instead, there are a number of possibilities based upon several situations. It is too simplistic to think that the best practices of other communities can be copied in fashion and result in a cohesive pattern of success. No community has ever been successfully transformed by trying to copy another community. The particular path that leads a community to become smarter will not be exactly the same for the community next door. However, certain steps that a community must take in order to at least move in the right direction. A community must solicit the active involvement of the community itself. Building the infrastructure first and asking what the people want second is a sure way to create a technology that nobody wants to use. This can be achieved by engaging key community leaders with positive professional and personal experience with information technology. In addition, community leaders should cultivate the involvement by technology experts, either individual or institutional, with a particular interest in the use and application of technology.

Secondly, the formation of a public-private partnership is vital in order to attract the resources necessary to implement a technology project. And finally, the public-private linkages should be made in a number of areas of the local economy including education, healthcare, local commerce, and government and services should be geared to allow to create utilities that cross the

<sup>17</sup> Blacksburg Electronic Village. 1994. "About the BEV Project." (Blacksburg Electronic Village). Available WWW: <http://www.bev.org/>

<sup>18</sup> NPTN. 1994 "Community Computing and the National Public Telecomputing Network." Available ftp: [nptn.org Directories/basic.guide.txt](ftp://nptn.org/Directories/basic.guide.txt).

<sup>19</sup> San Diego: City of the Future. 1995 InfoSanDiego-Talk. Available WWW: <http://rohan.sdsu.edu/infosandiego/>

For example, hospitals could provide healthcare education to children as part of a application.

Finally, a community can never claim to have fully reached the state of "smartness" be argued that there is still more to be learned. The process of becoming a SmartC never ending one.

## TACTICAL CONSIDERATIONS

Communities have both the responsibility and the opportunity to make decisions now their region to be economically competitive in the years and decades ahead. Commu not consider these changes risk obsolescence. The following describes some of the plans that communities need to be considering:

To compete in today's global and highly competitive world markets, it is essenti communities prepare for an emerging 21<sup>st</sup> century economy.

To survive against intensified competition not only from other developed regions increasingly from developing countries, a community must seize upon those niches already enjoys clearest primacy.

To plan appropriately for their future, it is critical that communities possess accurately reflects the changes and opportunities found within the new economy.

To maximize economic opportunities, the demand for new applications needs to be defined and understood. To realize the potential of these applications, the com understand how they enhance choice, convenience and control.

To plan appropriately for new infrastructure development, communities need to u resources already exist within their geographic area. The supply of available te infrastructure necessary to empower community development is theoretically alrea they are floating independently as isolated islands.

To guide community planning decisions, a systems approach is needed that emphas demand-driven applications, synergy between organizations and the development o partnerships.

To respond to the trend towards a mobile workforce, local/regional government h opportunity to affect change. However, the use of regulatory mandates is not ef motivating employers.

To demonstrate the advantages of a mobile workforce, distance education, and te more examples are needed of these innovations at work in real situations.

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Section 2:

# INVENTORY

SmartCommunities" Project