

Decision Support Tools for Community Planning

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Some of the challenges facing communities today involve dealing with a rapid growth in population and an even more rapid growth in land area because of low-density development patterns. Low-density development, often referred to as sprawl, comes in many forms, and its impacts, both positive and negative, are varied. Negative impacts include the loss of open space and prime agricultural land, as well as a transportation infrastructure that is predominantly car-dependent, with too little population density to support public transit.

In their efforts to create healthy communities, how can localities be helped to understand the costs and benefits of different development patterns and thus make more informed decisions? This is the underlying question of this article. Making informed decisions also is an important way to approach the issue of growth management for public agencies. It's about enabling communities to help themselves, rather than trying to regulate solutions.

In the United States in particular, the federal government is limited in how much it can tell local communities about methods of managing their land. But the federal government can play an important role in directing localities to a variety of tools and resources helpful to them in understanding their choices and making informed decisions. The result of the U.S. Department of Energy's (DOE) efforts on "Tools for Community Design and Decision," hopefully, will be healthier, more efficient, and more effective communities.

Many city and county managers are asking for tools and resources that improve community participation and input and that promote better decisions on land use and resource use. Local officials are frequently asked to make decisions without adequate information on the broader impacts of a proposed project or new development. How will a given project affect the community in terms of taxes, demand placed on the transportation network, increased demands on schools and other services, air quality, energy use, water quality, and the like? There is a need for "decision support systems" that can help community leaders understand these costs and benefits more readily.

Decision Support Systems: What Are They?

A bridge over a river is a useful metaphor for a decision support system. The water flowing below represents information, and in many ways, people are swimming in this information. After all, we live in the information age, and there is so much out there that it often is hard to know how to use it all.

But within this sea of data are pearls of wisdom: case studies of what works and what doesn't work; tried-and-true approaches to sustainable development; urban revitalization strategies that succeed; environmental preservation techniques linked with economic development; and methods for effective community participation.

Even when these pearls of wisdom have been located, managers may continue to feel stuck and at a loss for how to apply them. A colleague at DOE calls this syndrome "stranded inspiration," which occurs when communities inundated with good examples of other people's activities are left confounded as to how to use similar ideas in their own communities.

To help with this dilemma, decision support systems integrate information, tools, and participatory-process techniques to enable localities to move away from hit-and-miss development patterns toward more informed and vision-based decision making.

Tools and processes are the pillars of a bridge that can help us get across this sea. While tools are technological resources that help make sense of information, processes are ways in which people can apply information to make decisions, including techniques that increase public involvement and improve stakeholder input. Each pillar is critical; we may have the best tools in the world, but if they are not

integrated into the right process, we are not going to get where we want to go. And without the right tools, a process can hit a dead end.

Technology is dramatically changing the art and science of planning. John Fregonese, a planning consultant based in Portland, Oregon, points out that the changes we are seeing in the area of planning tools are analogous to the changes we have seen in the field of medicine. Early techniques like bloodletting were hit-or-miss attempts to attack symptoms, with little understanding of the causes behind them.

The CAT scan is an example of how we can now look at the body as a system, see under the skin, and locate and understand problems on a much more sophisticated level. More and more often, planners now have access to diagnostic tools that can help them reach more sophisticated, systems-level decisions.

The best example may be the ways in which geographical information system (GIS) technologies can assist planners in decision making. GIS tools give city and county managers the power to do computer mapping, tie data to places and processes, and understand development impacts in a spatial framework. These tools make it possible to see how the natural and built environments, plus the social and economic systems, of a community relate to each other on different scales and at different times.

Specific Tools for Community Design and Decision Making

So what's out there in terms of approaches to rural and urban design and to the decision-making process? A wide array of tools has emerged over the years, falling into many categories, including visualization, impact analysis, integrated GIS, predictive modeling, and community process tools. Here is a sampling of a few tools that planners might find useful.¹

Box City.² The Box City planning method is a great example of a low-tech, highly effective, visual decision support tool. The low-tech aspect of Box City is one of the reasons it works so well. It uses kindergarten art supplies like box, paper, scissors, paste, and markers so that 4-year-olds, 40-year-olds, and 80-year-olds all know how to participate. These materials are used to build a 3-D replica of one's neighborhood, highlighting the treasures and precious elements that people want to preserve, as well as the things people want to change. It becomes a platform on which people can discuss where they are today and where they want to go in the future.

In Kansas City, Missouri, Box City was used by roughly 100 Washington-Wheatley neighborhood residents, who used cardboard and paper to construct tiny buildings, parks, and playgrounds. They built a miniature model of how they would like Prospect Avenue to look in the future. The Box City project then was photographed, documented, and translated into a plan for the city to implement.

Photomontage. Another visual technique is the photomontage, which is fancy lingo for doctoring up digital photos. Through photomontaging, an existing image has been given a facelift and a possible vision for the future.

When communities can see "dreaded density" as a specific realistic image, they often say, "Well, that might not be too bad. I could live there." Even more important, a photomontage helps people see the relationship among different design elements. Adding a mixed-use development with combined retail and housing units, for instance, can make other elements fall into place. Now that there are more people living in this particular location, with more jobs to fill, a light-rail line has become viable.

With an increase in housing and jobs, a street market also becomes more viable. When people see that they are going to get nice shops and places to "hang out" in with neighbors, they realize that there is a trade-off between density and amenities. In essence, the discussion topic switches from density to design.

3-D renderings on computers also have become more sophisticated and affordable. This technique can show the visual impacts of adding light rail to a street median, for example, or the change in

neighborhood appearance with a new bridge or other transportation project where this might otherwise be hard to imagine.

CommunityViz.³ On the more sophisticated end of the spectrum of tools, CommunityViz software is a set of GIS-based planning and decision support tools designed to empower people at different skill levels. It integrates GIS mapping and impact analysis information, 3-D visualization, and policy simulation technologies, which can be applied to a variety of planning and design issues in communities and towns. CommunityViz provides an interactive, 3-D, real-time environment in which citizens and professionals can analyze proposed plans for their communities.

Users can propose policies and suggest design alternatives, seeing the aesthetic and cost impacts immediately. They can then visualize how different ideas might affect their environment in physical, economic, and social ways. This interactive process enables citizens, planners, designers, and public officials to make informed choices and to build consensus on proposed designs and public policies.

In Lyons, Colorado, the planning commission is using CommunityViz to develop a list of indicators of community values. Next, it will transform the permitting process from a first-come, first-served system into a system whereby proposed developments are tested against these indicators, and those projects that perform the best will get approved. This process effectively puts community values ahead of development interests.

UrbanSim. Designed to assist communities in integrating their land use, transportation, and environmental planning efforts, UrbanSim is a simulation system that models the real estate development process and the locations of households and jobs based on scenarios of transportation, land use, and environmental policies.⁴ It is meant to support a community-visioning process by allowing communities to explore the potential consequences of alternative policy scenarios, such as light rail or highway expansion, and the use of urban growth boundaries and land-use plans to guide development.

By subdividing a metropolitan area into a grid system of 150-meter cells, the model is able to evaluate both neighborhood-scale and regional-scale issues. The UrbanSim system, now operational in several major metropolitan areas, is available from the Internet and has been developed as an Open Source project, meaning that the software and its source code is free and available for modification and redistribution.

Community Process Tools

Community process is a concept well embedded in U.S. history, involving ideas as basic as Jeffersonian democracy and civic engagement. Emerging technologies can help improve this process. Community process technologies include meetingware and keypad voting, which give stakeholders a more effective voice in decision making.

In 1999, for example, Mayor Anthony Williams used these technologies in Washington, D.C., to host a citywide town meeting on the city's strategic plan. Some 3,000 citizens participated in the exercise, which involved 300 tables with computers on them and 3,000 keypads to let everyone vote. On a level rarely seen, the organizers were able to collect an impressive amount of feedback from citizens. The important thing was that these tools helped the organizers to aggregate the comments by neighborhoods and stakeholder groups and thus to write a comprehensive plan to address different needs and concerns.

And, with Web-based meeting services, citizens don't have to be in the same room to participate in town meetings. Don't, however, underestimate the value of meeting and talking face to face for building an effective community process.

A major challenge facing managers and planners is finding ways to integrate these tools into community decision making most effectively. It is important not to let the tool dictate the process. Instead, managers

should identify the process needed to get the job done and then decide what sort(s) of tools are needed to make it happen.

PLACE³S. PLACE³S is an example of a process that uses a variety of these tools to generate success. PLACE³S-which stands for PLAnning for Community Energy and Economic and Environmental Sustainability-is a methodology for community-based planning that was developed by the state energy offices in Washington, Oregon, and California.

It uses a five-step, community-directed process. Through a visioning procedure that engages stakeholders, participants develop and evaluate alternatives that will improve upon business-as-usual conditions. One possible alternative would focus on maximizing resource efficiency. This is called the "advanced alternative," in which PLACE³S compares energy use, resource use, and their links to issues like cost and air quality.

The participants then work to hybridize the prior alternatives into a "community-preferred alternative." In the process, the community makes informed choices about trade-offs (lower-density transit means about \$200 more per household in gasoline costs, e.g., and these dollars will leave the local economy). The ultimate objective is a well-understood and widely supported plan, with a mechanism to implement it.

Regional Resource Centers

The best systems for decision support bring diverse people together in one place. Face-to-face interaction, mediated through the skilled use of decision-making tools, can help dissolve differences and fashion a unified vision of the future of the community.

Through a series of national workshops, the concept of setting up regional resource centers around the country has emerged. Chattanooga, Tennessee, has been at the forefront of making this concept a reality and is in the process of building a resource center as part of its trade center. The center will serve as an institutional knowledge base on the topic of Chattanooga's past (how the city got to where it is today), as well as a resource for determining the city's future.

Dramatic Changes Possible

The tools reviewed in this article have proved useful on multiple fronts. They have helped communities visualize where they are today and where they want to go in the future; they have helped decisionmakers quantify the impacts of their choices in terms of energy use, resource use, and other economic and social indicators; and they have aided city and county managers in improving public process, increasing public participation, and building a broad-based consensus on projects.

Advances in technologies hold the potential to change dramatically how communities shape their future. They can help shift decision making from a regulatory approach that mainly tries to prevent bad things from happening by telling people what they can't do, to a more proactive approach whereby decision making is optimized through rapid feedback on the impacts of different choices.

In essence, good tools, correctly applied, make the costs and benefits of choices more apparent and empower people to act more intelligently.

¹The tools described here represent just a sample of the tools available to communities. Reference to any specific commercial product, process, or service by trade name, trademark, manufacturers' name, or otherwise does not necessarily imply its endorsement, recommendation, or favoring by the United States government or any agency thereof. Reproducing or reprinting of this material may require the explicit consent of the copyright owners.

²For more information on Box City, visit the Web site at <http://www.cubekc.org>.

³CommunityViz represents a suite of tools being developed by the Orton Family Foundation in partnership with several developers, including Green Mountain GeoGraphics, Ltd.; Fore Site Consulting, Inc.; MultiGen Paradigm, Inc.; and PricewaterhouseCoopers. For more information, visit <http://www.communityviz.org>.

⁴UrbanSim is a software program developed by the University of Washington with funding from the National Science Foundation and state and metropolitan agencies. For more information on UrbanSim and to download the model, visit its Web site at <http://www.urbansim.org>.

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