A new toolbox for urban analysis

Researchers look to new data, tools to better plan successful cities

By Carolyn Y. Johnson  GLOBE STAFF  OCTOBER 03, 2011
CAMBRIDGE - What makes a location a good place to set up shop? Is it a nearby T station, or visibility on a busy corner? Is it better to be in the midst of a strip with lots of other stores, or within a 10-minute walk of many offices?

The field of urban design has long been more of a craft than a science, but researchers are developing new ways to use large datasets and quantitative tools, including some that analyze social networks, to better understand cities.

The goal is to gain more rigorous insight into how a city’s shape - its configuration of

http://www.bostonglobe.com/business/2011/10/02/researchers-planner-technology-improve-urban-design/CYd5FejSOV1r7aBFrcvT0H/story.xml
streets and buildings - affects how it is used, and to marshal massive amounts of data to improve a city’s function. Such methods could help reveal whether a spot is a good place to open a new coffee shop, understand the success of a bustling commercial area such as Harvard Square, and create a solid foundation of evidence to guide city design.

“This is opening up a new area, taking a much more rigorous approach to look at the work of urban design, and how the form of a city affects the life that goes on in it,” said Andres Sevtsuk, a lecturer at MIT and head of the City Form Research Group. “We’re very good at proposing new ideas, but rarely go back and see how those ideas work.”

Sevtsuk recently launched the Urban Network Analysis toolbox - software that allows planners and architects to study urban areas by analyzing different aspects of location. For example, it’s possible to measure a location’s “reach,” how many locations, jobs, or residences are accessible when traveling by the street network; or “betweenness,” a measure that can be used to estimate the amount of foot traffic an area receives. Such an approach could be used, for example, to estimate the impact a new T station would have on an area, or help decide what would be the best use for a building.

Other projects aim to provide technology tools to citizens and activists, so ideas that may have been left out of traditional data sources can be gathered. For example, researchers at Emerson College have worked with the Asian Community Development Corporation and the Metropolitan Area Planning Council on an initiative called Participatory Chinatown, which uses a video game interface to gather the opinions from the community about the future shape and character of that neighborhood.
“There’s been interest in incorporating data into planning for a long time and I think every 10 years, someone says at last we have the data, that planning doesn’t need to be this irrational practice anymore - everything can be scientifically determined,” said Frank Hebbert, director of civic works at OpenPlans, a nonprofit in New York City that builds new technologies to enable civic involvement in transportation and planning issues. “Twenty, 30, 50 years ago, there were academic groups or maybe the IBMs of the world had a supercomputer that could crunch through property records and look for interesting things. Now, that’s something a group of enthusiastic people who are city planners or data enthusiasts can over the weekend - download some data and start to explore.”

While not yet widely used in planning, such tools are beginning to be deployed. An online tool developed by OpenPlans is being used to mine public opinion about where new kiosks for a bike-sharing program should be located.

Traditionally, Sevtsuk said, planners and economists have treated cities like a featureless plain with a certain number of dwelling units per acre or an amount of retail space in a given radius. Such measures, he points out, hardly reflect how most people experience their neighborhoods, since people do not navigate cities as the bird flies, but by traveling along networks of city streets.

With more exact measures, it’s possible to look at the effects of different aspects of location. For example, is a group of stores and restaurants clustered together because some aspect of the location is especially attractive, or are they drawn there in part by the presence of other stores?

Sevtsuk has found that in a restaurant-dense area like Inman Square, the presence of competitors works to businesses’ advantage: “The idea there is by forming a cluster, they manage to attract a much larger clientele than the sum of each one alone,” he said.

Such tools can also give planners a better handle on how to rationally fix cities.

Jurij Paraszczak, director of the smarter cities program at IBM Research, gave the
example of a project that had looked at the infrastructure of water pipes in Washington, D.C., providing the power to understand the network of leaks and pipes instead of focusing on case-by-case problems as they came up.

“When you’re trying to optimize things you need to be quantitative,” Paraszczak said.

Nigel Jacob, cochairman of Mayor Thomas M. Menino’s office of new urban mechanics, is focused on developing new tools to help connect the city with its citizens.

Jacob said the city, working with local universities, is in the early stages of finding ways to use mobile phone data to get new insights into how Boston works. Right now, he noted, the technology provides ways to monitor or report graffiti or potholes. But he sees much larger potential.

“I think this is absolutely revolutionary — so much so that we’re only beginning,” Jacob said. “The ability to move to a world where we’re making decisions based on models that are evolving over a period of time, in space, based on people’s behavior, is pretty profound.”

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