

# Traditional social networks fueled Twitter's spread

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Graphic: Christine Daniloff

We've all heard it: The Internet has flattened the world, allowing social networks to spring up overnight, independent of geography or socioeconomic status. Who needs face time with the people around you when you can email, text or tweet to and from almost anywhere in the world? Twitter, the social networking and microblogging site, is said to have more than 300 million users worldwide who follow, forward and respond to each other's 140-character tweets about anything and everything, 24/7.

But MIT researchers who studied the growth of the newly hatched

Twitter from 2006 to 2009 say the site’s growth in the United States actually relied primarily on media attention and traditional social networks based on geographic proximity and socioeconomic similarity. In other words, at least during those early years, birds of a feather flocked — and tweeted — together.

In their study of Twitter’s “contagion process,” the researchers looked at data from 16,000 U.S. cities, focusing on the 408 with the highest number of Twitter users and seeking to update traditional models of how information spreads and technology is adopted.

Just as marketing experts sometimes label consumers as early adopters, early majority adopters, late majority adopters or laggards, the researchers characterized cities in those terms, based on when Twitter accounts in a given city reached critical mass. Critical mass is generally defined as the point when something reaches 13.5 percent of the population, which for this study was 13.5 percent of the highest total number of Twitter users in a city through August 2009, the end of the study period.

As with most technologies, the growth in popularity initially spread via young, tech-savvy “innovators,” in this case from Twitter’s birthplace in San Francisco to greater Boston. But the site’s popularity then took a more traditional route of traveling only short distances, implying face-to-face interactions; this approach made early adopters of Somerville, Mass., and Berkeley, Calif. — cities close to Boston and San Francisco, respectively. Twitter use then spread through early majority cities such as Santa Fe and Los Angeles and late majority cities such as Baltimore and Las Vegas before reaching laggards such as Palm Beach, Fla., and Newark, N.J. All these cities ultimately ranked among the 408 nationwide with the largest numbers of Twitter accounts.

“Even on the Internet where we may think the world is flat, it’s not,” says

Marta González, assistant professor of civil and environmental engineering and engineering systems at MIT, who is co-author of a paper on this subject appearing this month in the journal PLoS ONE. “The big question for people in industry is ‘How do we find the right person or hub to adopt our new app so that it will go viral?’ But we found that the lone tech-savvy person can’t do it; this also requires word of mouth. The social network needs geographical proximity. ... In the U.S. anyway, space and similarity matter.”

For nearly 50 years, marketers have studied the “diffusion of innovations” (named by Everett Rogers in his 1962 book of the same title) to predict how the purchase of expensive, durable goods such as cars and refrigerators will spread. But the diffusion of high-tech websites and cheap smartphone apps is thought to occur in a very different way.

“Nobody has ever really looked at the diffusion among innovators of a no-risk, free or low-cost product that’s only useful if other people join you. It’s a new paradigm in economics: what to do with all these new things that are free and easy to share,” says MIT graduate student Jameson Toole, a co-author of the paper.

Meeyoung Cha of the Korea Advanced Institute of Science and Technology is the third co-author, and also the person who had the prescience to begin downloading Twitter-published user data (via Twitter API) in May 2006, when there were only a couple of hundred users. She downloaded data through August 2009, when user growth dropped off for a time.

González and Toole said their model of Twitter contagion didn’t fit Cha’s data until they added media influence, based on the number of news stories appearing weekly in Google News searches, data they acquired using Google Insights for Search, which provides historical search-engine data.

“Other studies have included news media in their models, but usually as a constant,” González says. “We saw that news media is not a constant. Instead, it’s media responding to people’s interest and vice versa, so we included it as random spikes.”

The study data include the growth spike that began April 15, 2009, when actor Ashton Kutcher challenged CNN to see who could first attract 1 million Twitter followers. Kutcher ultimately won, reaching the million mark in the wee hours of April 17, about half an hour before CNN. Popular talk-show host Oprah Winfrey invited Kutcher to appear on her show that same day; when she ceremoniously sent her first [tweet](#), the pace of new news stories picked up again, and so did new Twitter accounts.

The Twitter bird was suddenly on all the wires, and [Twitter](#)’s user accounts increased fourfold because of the media attention, indicating that as recently as 2009, location-based social networks and media attention still held sway over computer-based social networks.

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