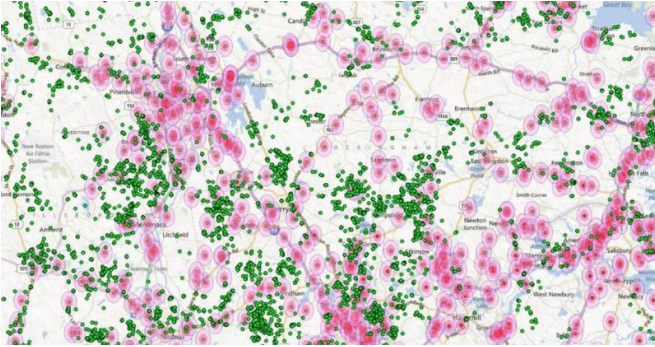


Poor cell phone coverage creates a 'mobile divide'

4 May 2016, by Bill Steele



Cell phone towers (pink) are often surrounded by clusters of "femto-cells" (green) that indicate a poor signal from the towers. While femto-cells offer a solution for the affluent, their presence indicates that lower-income residents in the same areas are getting substandard service.

If you live on the wrong side of the tracks, you may also be on the wrong side of the "mobile divide," where poor cell phone service may limit your economic opportunities.

Cornell researchers have mapped cell-phone [signal strength](#) across a large city, finding that low-income areas receive almost 15 percent less network [coverage](#) compared with their affluent counterparts.

The result is particularly significant in light of the fact that lower-income people tend to get most of their internet access only through their phones. Many also have no fixed land-line phone service at home, relying on cell phones at home and away. The Catch-22 is that regions with substandard access tend to become more economically depressed, encouraging service providers to continue to turn their attention to more affluent neighborhoods.

"Mobile access is the access," said Aija Leiponen,

associate professor in the Dyson School of Applied Economics and Management. "Our results reinforce the belief that there is a mobile divide between individuals and households in urban or affluent areas and those in rural or lower-income areas. Insufficient [mobile coverage](#) may further contribute to the decline or slower development of these areas."

Leiponen and Pantelis Koutroumpis, of the Imperial College Business School in London, reported their results in the March 15 online edition of the journal *Telecommunications Policy*, and in a forthcoming print issue.

One solution to poor coverage is a "femto-cell," a device that connects to a [phone service provider](#) via the internet and broadcasts a [cell phone](#) signal over a small area, such as a single home or building floor. Along with the first cost of the device there is a fee for the service and a broadband internet connection is required, so this solution is mostly for the affluent.

But a cluster of femto-cells is a red flag identifying areas with poor coverage. Along with that clue the researchers drew on coverage data from the organization OpenSignal, which distributes a free app that measures signal strength. In return for running the app and sending in reports, users get information on signal strength and where to go to get a better signal.

This "crowdsourced" mapping showed that "access to [mobile communication networks](#) depends on income, population density and education," the researchers said. An economic analysis in their paper shows how these factors enter into the providers' decisions about where and how much to expand their service. This is the first such analysis, the authors said, because cell [phone service](#) providers have been reluctant to release information on the locations and coverage of their towers.

One reason poor service can depress the economy, Leiponen suggested, is that small businesses may not want to move into an area where they will not be able to communicate with their customers or their employees. Individuals, meanwhile, may find it harder to get and keep jobs, and will be deprived of information about goods and services and community issues. Affluent nations, the researchers point out, often have excellent mobile coverage. That coverage may be part of the reason for the affluence, they said.

"Creation of another digital divide is not societally desirable," the authors conclude, and they suggest FCC regulations intended to provide equal access to internet service might be extended to include wireless providers. The goal of their report, they said, is to identify and quantify the extent of the problem and open a conversation about communications policy.

At this writing the FCC has released an order to expand broadband access, including mobile broadband, to low-income households.

"This suggests the FCC is aware of the underlying policy issues, but probably not of the fact that mobile coverage varies so widely according to income levels, even within broader metropolitan and suburban areas," Leiponen said. "[Our study shows that] underserved communities may not only be in rural parts of the country but almost anywhere."

More information: Pantelis Koutroumpis et al. Crowdsourcing mobile coverage, *Telecommunications Policy* (2016). [DOI: 10.1016/j.telpol.2016.02.005](https://doi.org/10.1016/j.telpol.2016.02.005)

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