SUSTAINABLE DEVELOPMENT'S BIG DATA REVOLUTION

How information gleaned from mobile networks could help developing countries meet sustainability goals

POSTED BY BRIAN BANKS ON JANUARY 15, 2019

Can the same technology that's used to pinpoint mobile phone users' locations to target them with localized advertising also help alleviate poverty, stifle disease and create better, more equitable infrastructure in the developing world?

It's an intriguing, if unusual, question. It's also one that's top of mind these days for Sriganesh Lokanathan. He's the leader of the South Asian component of a two-year IDRC project to help countries in South Asia, Africa and Latin America use "big data" — the mountains of digital information collected in administrative records, commercial transactions, social media and through sensors and tracking devices, including mobile phone networks — to meet the UN Sustainable Development Goals, or SDGs.

The project's inspiration was the United Nations' call for a "data revolution for sustainable development" in 2017, following the body's adoption of the 17 SDGs in 2015. But the subject has been a focus for Lokanathan, head of big data research at LIRNEasia, an information and communication technology policy think-tank based in Colombo, Sri Lanka's capital, since 2012. At first, Lokanathan, a veteran data scientist and policy expert who has studied in the United States, Singapore and South Africa, was a little ahead of the curve. "It's like I was going door to door saying, 'Have you heard the good word of big data?" he says.

But what he saw then — and what the UN and many more policy makers and government officials have now formally recognized — is that big data offers a trove of timely demographic and socioeconomic information to help data-starved countries enact policies to meet the SDGs and measure progress toward them.

"A census is only done every 10 years. And surveys are expensive — you cannot do them frequently," Lokanathan explains. "So how do you get insights otherwise?" Most of Lokanathan's work in the IDRC project's first year has focused on the policy front, building coalitions with the private sector and government in Sri Lanka and across the region. But his earlier research with mobile phone usage data highlights its potential.

"Every time you make or receive a call or send an SMS, the system records the phone number calling, who it is calling and the base station they connect through," he explains. His team worked with several mobile operators to obtain the call data records — with all identifying data stripped out to ensure anonymity — from two provinces in Sri Lanka, including the area in and around Colombo.

He and his team ran their analyses — massive number-crunching efforts done on their own custom-built server farm — to extract observations based on the call data itself or in conjunction with other
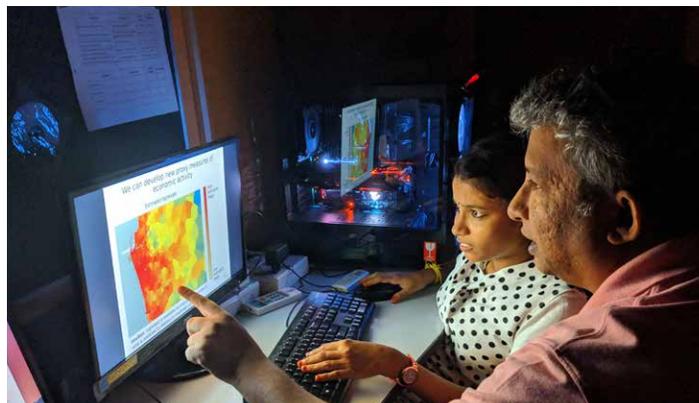
Sriganesh Lokanathan (right) and Yashothata Shanmugarajah discuss insights on economic activity as inferred from the analyses of big data from mobile networks in Colombo, Sri Lanka. (Photo: LIRNEasia)

data from traffic cameras, satellites and social media. The results shed light on mobility patterns, population density (hourly, daily, weekly), traffic flows and transportation systems use, land-use patterns, informal economic activity and more. They were also able to show mobile data's potential in forecasting potential disease vectors.

"One of the things we wanted to understand, for example, was how people come in and go out of cities, where they come from and where they go," says Lokanathan. "We can also start to understand a little bit about who's rich and who's poor based on the areas where they're coming from."

The latter, he says, helps address questions like: Do poor people have to travel more for work? "If you can understand this better, then it can translate into transportation policy decisions."

A key advantage with mobile big data is that it provides widespread coverage of all segments of the population. In Sri Lanka in 2016, there were 118.5 mobile subscriptions for every 100 people compared to just 32 internet users per 100 — with comparable ratios found across much of the developing world.

But Lokanathan stresses that the idea is not to draw on one data source in isolation for decision-making, but to combine it with other information. "You need to take that big data and throw in some official statistics, figure out ways of putting them together. That's what really gives you the insights."

In a similar vein, a key goal of Lokanathan's work within the IDRC project is to help create networks of expertise in the use of big data across the developing world. "My ideal scenario," he says, "is that in two years I won't being doing half the things I'm doing today in other countries because someone else will be doing them."

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READING AS THINKING

1. Define "big data." Include two examples of this type of data in your answer.

2. List some potential benefits of collecting demographic and socioeconomic information from mobile devices instead of censuses or surveys.

   a. _____

   b. _____

   c. _____

3. What are some of the questions that Sriganesh Lokanathan and his research team are hoping to answer?

4. In the article, Lokanathan suggests that big data collected from a single source should always be combined with other information, such as government statistics. What do you think he means by this? Why is this important?

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5. One of Lokanathan's goals is to "create networks of expertise in the use of big data across the developing world." List a few ways that he could achieve this goal.

a. _____

b. _____

c. _____

6. Visit the website for the **UN Sustainable Development Goals**. In the table below, list five goals that you feel stand out above the rest, as well as reasons for why you think these goals are important, and one fact related to each goal.

GOAL	REASON	FACT

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7. If you were given the opportunity to add three goals to the UN's list, which goals would you add? List them below, as well as a reason for why you think they are deserving of being added to the list.

GOAL	REASON

Think-Pair-Share

Think

8. Lokanathan's research highlights the social good and benefit that comes from people providing their personalized data to researchers. But many people who use technology have a fear of sharing their data and their records. Keeping this in mind, consider the following:

a. Have you discussed with your family, friends or teachers the reasons for and against sharing personal data? If so, how do most people feel about it? What reasons do people often have for sharing or withholding their data?

_____

_____

_____

_____

b. What are your own personal feelings on the matter? For example, do you think receiving ads on the web about items you have searched for is helpful or intrusive? Do you like it when companies such as Netflix make suggestions based on your viewing history? Do you tend to be OK with certain information being known by particular companies but not others?

_____

_____

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_____

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Pair

9. Practice preparing for a debate! Have the class split into two groups: the first group will represent people who support using technology and data from mobile devices for research, sustainability practices and local, regional and global development; the second group will argue against this. After forming the groups, conduct research and develop supporting arguments for your side. Find facts and statistics that will serve as evidence, and keep track of any cases or examples you encounter that will help you with a rebuttal. Note to teachers: if students are young or if access to the web is limited, resources can be provided to the students, such as newspaper and magazine articles, blog posts, surveys, data, etc.
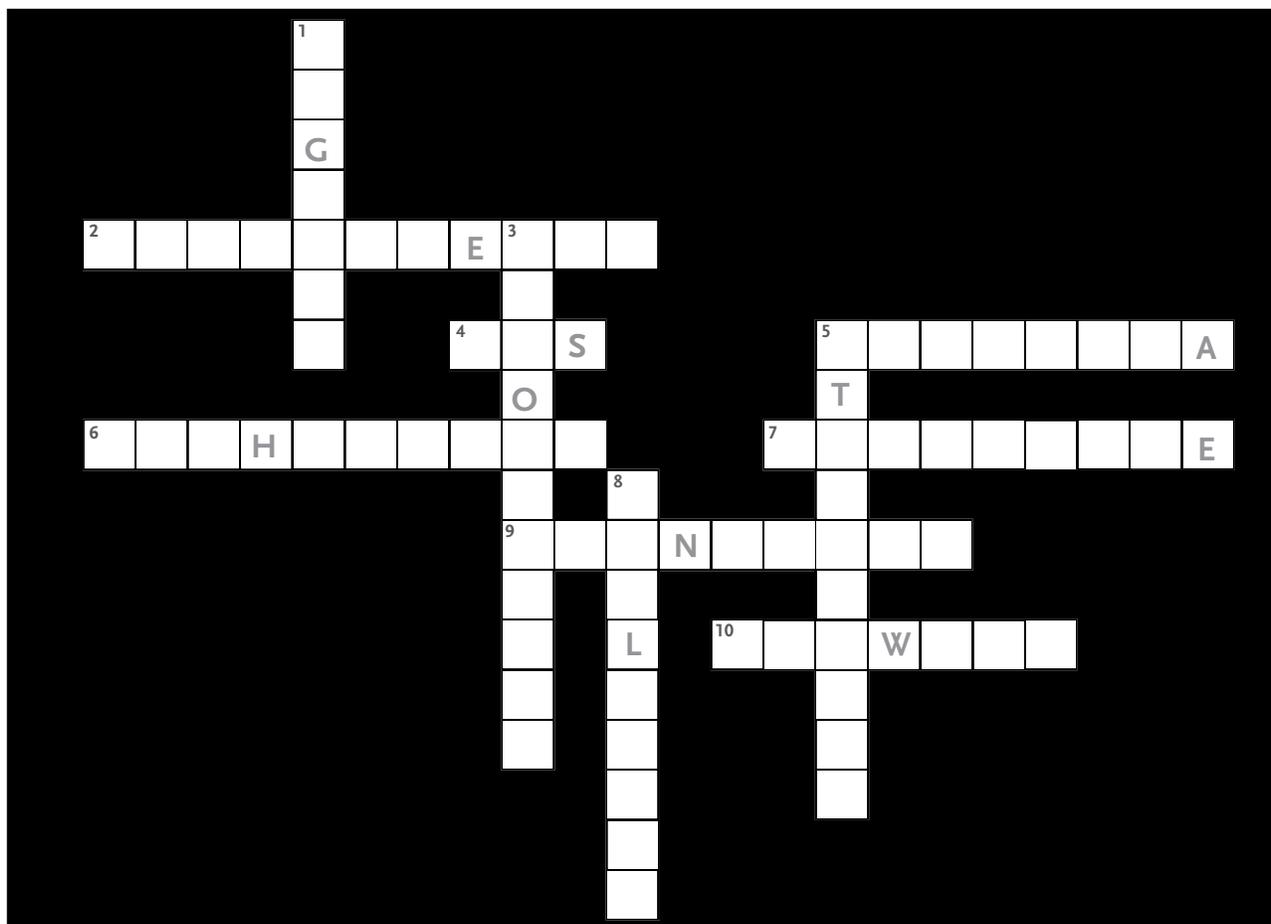
Share

10. Time to debate! For the first half of the debate, each team gets an equal amount of time to present arguments for their side. In the second half of the debate, each team gets an equal amount of time to rebut arguments presented in the first half. The teacher can act as a moderator during the debate and, if they wish, as a judge at the end of the debate.

ONLINE

- **The 17 Goals**
- **Canada's commitment to the 2030 Agenda for Sustainable Development**
- **A Very Short History of Big Data**
- **Big Data for Sustainable Development**
- **Debate preparation worksheet**
- **Privacy and kids**
- **Be Internet awesome**
- **Using mobile phones in data collection: Opportunities, issues and challenges**

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CROSSWORD:

Across

2. Websites and apps that enable people to create and share content online (two words)
4. The abbreviation for short message service
5. Most of Lokanathan's work to date has been done in this island nation south of India (two words)
6. Machines and equipment developed from scientific knowledge
7. A machine capable of orbiting planets and collecting information or relaying communications
9. The condition of being unidentified
10. A group or system of interconnected people or things

Down

1. Very large datasets that can be analyzed to reveal patterns and trends related to human behaviour and the environment (two words)
3. A particular portion of the population, or relating to population structure
5. The science of collecting and analyzing numerical data
8. An alliance of different political parties, governments, countries or communities