

Challenges of data-informed governance in Sri Lanka

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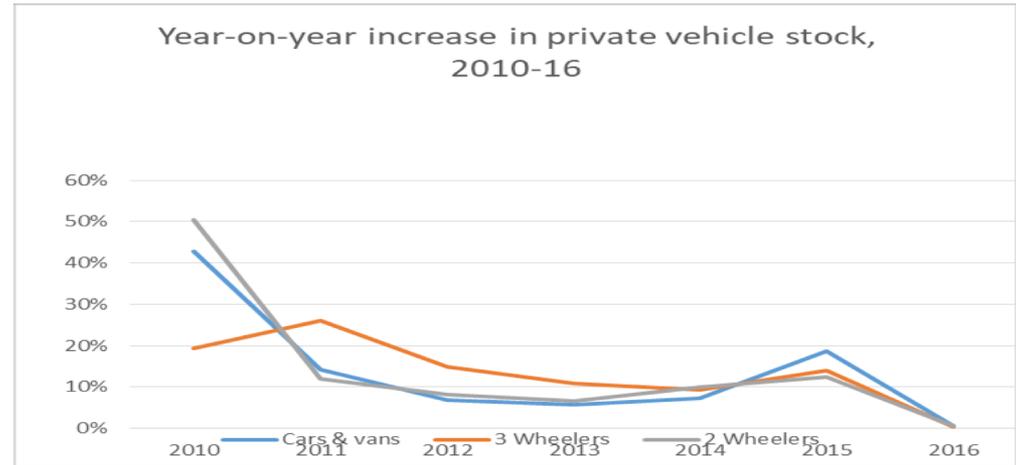
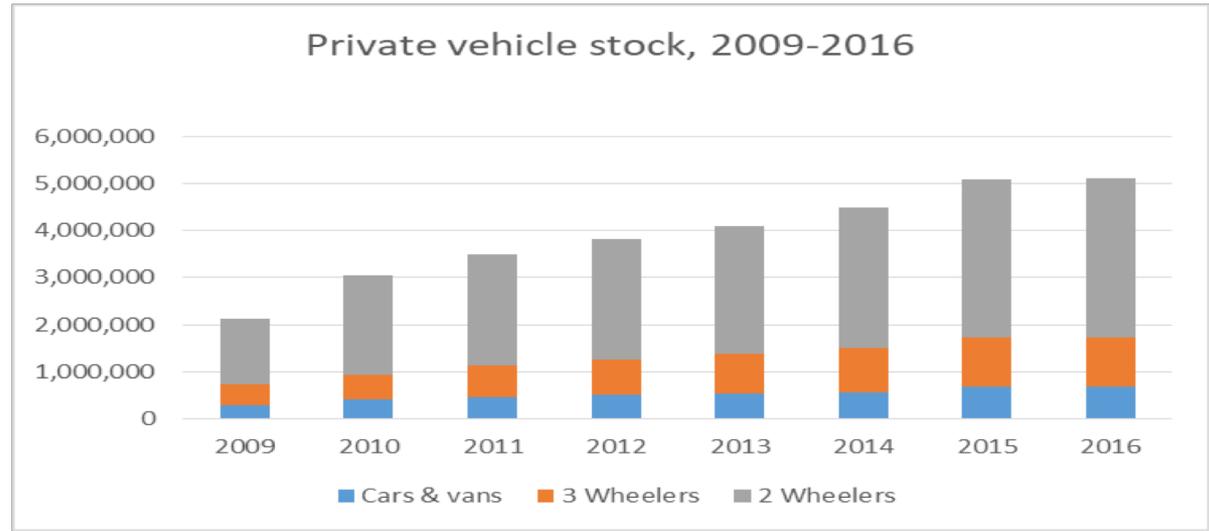
- Seeks to discuss data-informed governance in Sri Lanka, a middle-of-the-pack developing country
 - Lower-middle-income country (GNI per cap USD 3,840, current dollars; GNI per capita of USD 11,326 in 2011 USD PPP)
 - Population of 21.4 million (2018 HDI rank = 76)
 - Reached 100th place in Doing Business Ranking in 2018 (advance of 11) but is at 94th place in the Gov Development Index (a retreat of 17 places since 2016)

Data-informed governance:

External entity provides insights based on data analytics; government uses insights along with other conventional inputs

Use of data in urban and transport planning

- Since the end of the civil conflict in 2009, massive increase in private vehicles on the roads
- Vehicle stock in each category doubled by 2014, resulting in major congestion, especially in major cities
- Urban and transport planning become high priorities with Western Megapolis Development becoming the country's flagship development initiative



The core of transport and logistics planning has not changed for the last 25 years*

Road networks are modified or expanded based on complex interactions of politics, regional economics, policies and observed demand.

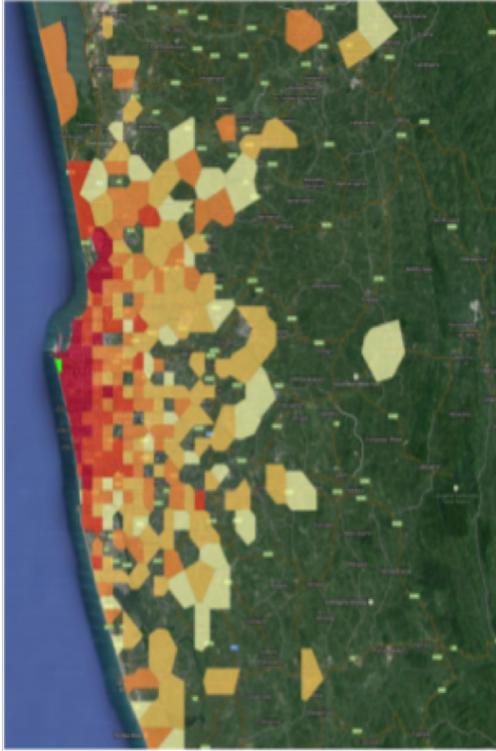
Transportation forecasting is key: estimating the number (and natures) of vehicles or people that will use a specific transportation facility in the future.

Typically, developed countries use a quantitative process to help decision-making

- **Trip generation**
Determining the origins, destinations, number of trip made by people of a zone, and the purpose for which they travel.
- **Distribution analysis**
Origins and destinations are then matched, often using a gravity model.
- **Mode-choice analysis**
Analyzing the modes of transport for these trips - usually auto or transit.
- **Route assignment**
allocating different modes of transport to a planned route and using various models to understand how traffic patterns change.

This is paired with policy and with **land-use forecasting**, which tries to take into account things such as population growth, employment, socioeconomics of zones in a given region.

Where data analytics can help is with insights that are otherwise expensive to capture

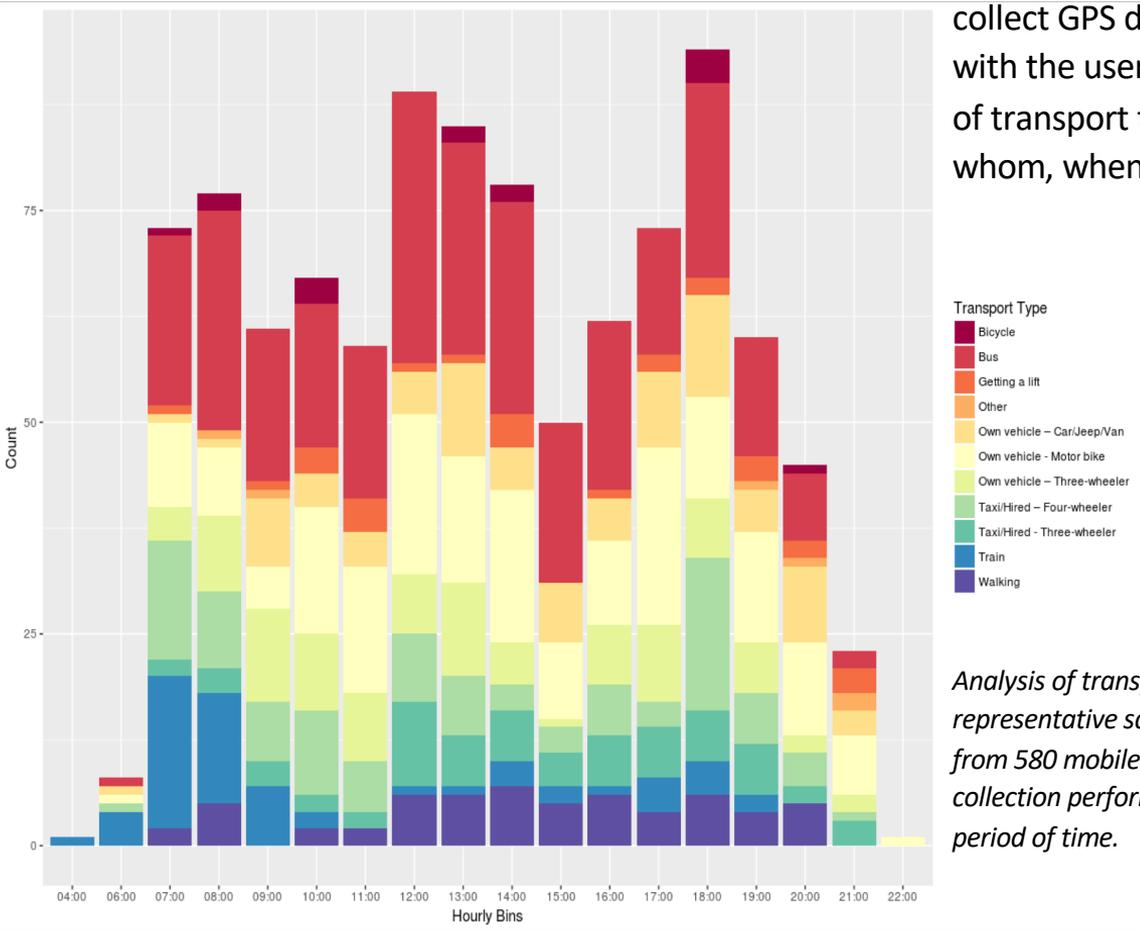


1. Mobile network data can be used to estimate origins destinations and to generate trips between them.

This is something that would otherwise require enormously detailed surveys.

Geographical distribution of origins to Colombo Fort, based on 2013 call data. D. Maldeniya, A. Kumarage, S. Lokanathan, G. Kriendler, K. Madhawa, "Where did you come from? Where did you go? Robust policy relevant evidence from mobile network big data", CPRSouth, 2015.

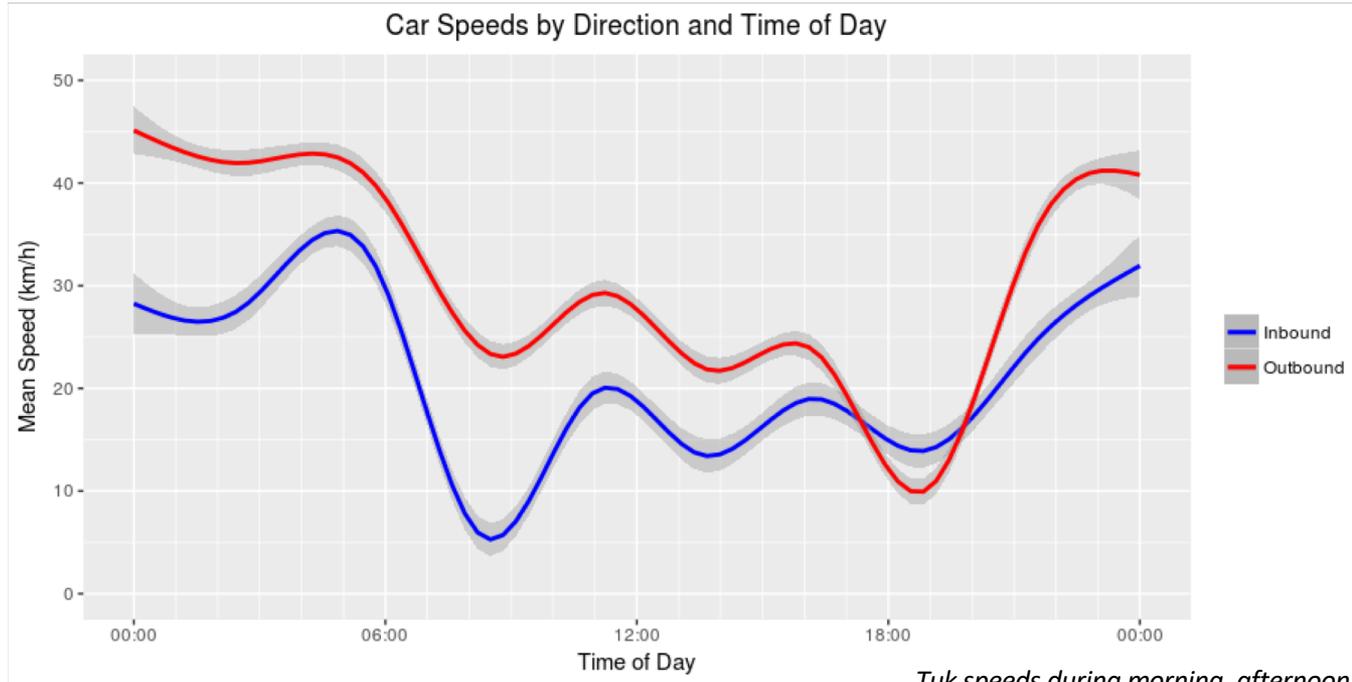
2. Smart survey applications that can collect GPS data while interacting with the user can describe the types of transport taken for these trips, by whom, when and what for.



Analysis of transport modes from (a non-representative sample) of over 9000 data points from 580 mobile phone users in Colombo. Data collection performed by an application over a period of time.



3. And finally, allow testing the efficacy of proposed routes by analyzing speeds, times, and where bottlenecks form.



Tuk speeds during morning, afternoon and evening traffic peaks.

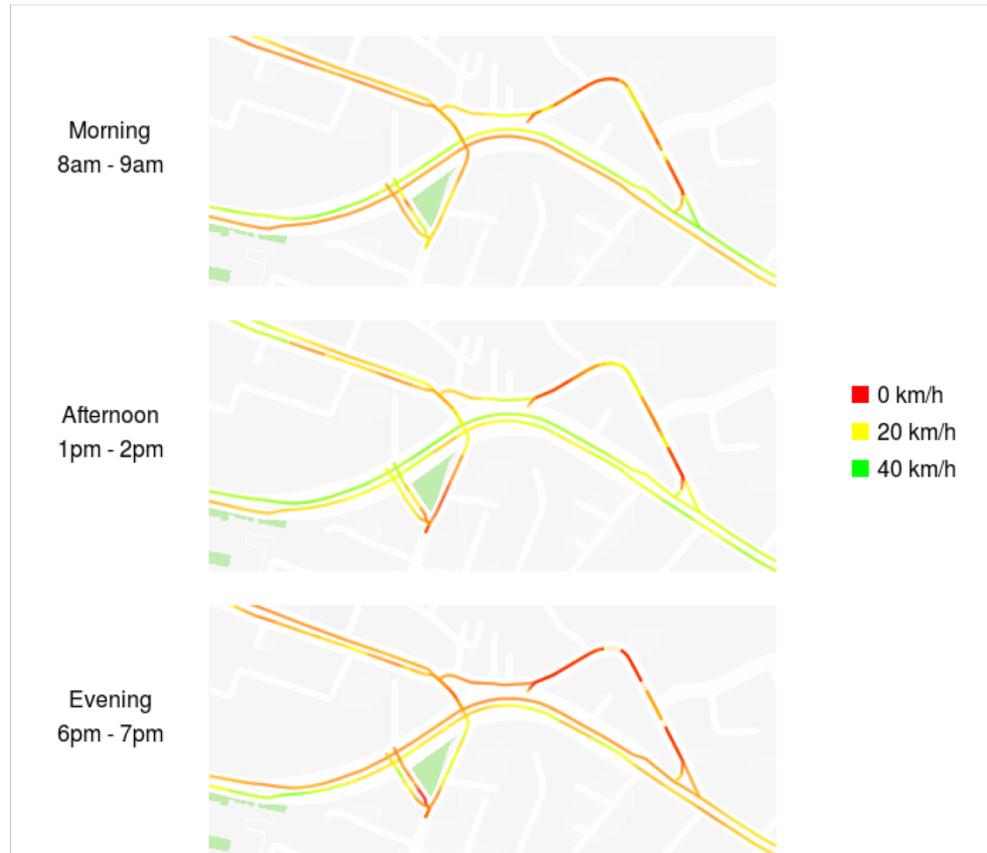
However, planning is only one component. Road networks are not static things

Transport is dynamic: within the day and within the week; what we need when we're young and single, what we need when we have families and what we need when we are old.

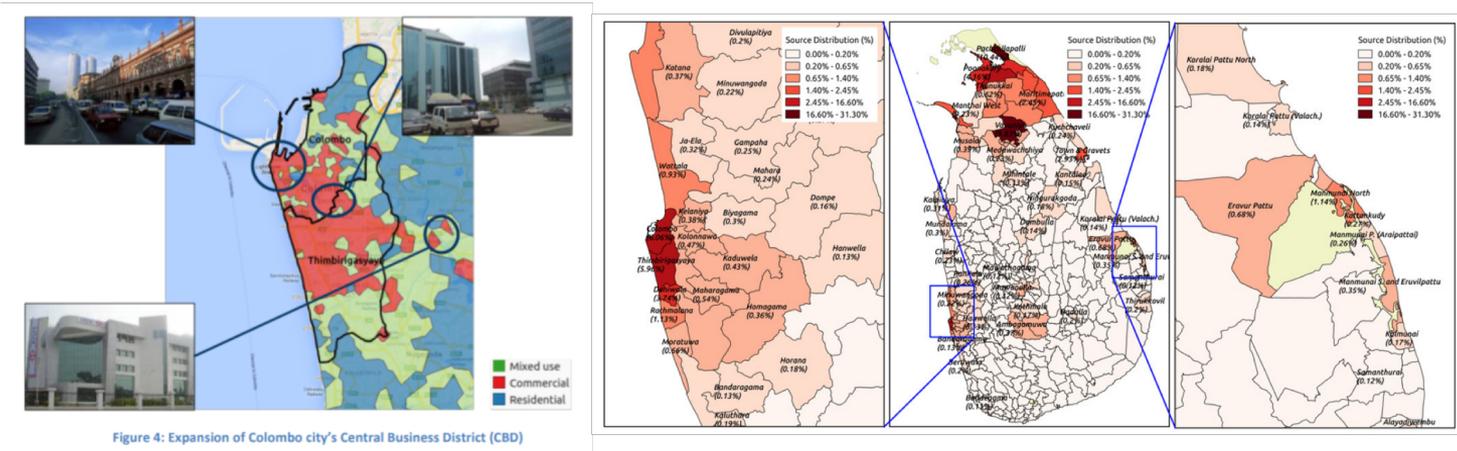
A key feature of being able to collect this data at scale and frequently is that we can continuously monitor how people use road networks once they are built.

The analyses that help to plan roads can be run indefinitely.

Traffic speeds at different times on a newly constructed flyover, using data from taxis



Big data can even aid in analysis of land use and population change. And all of this can be done faster than with traditional sources of data (surveys) and more frequently.

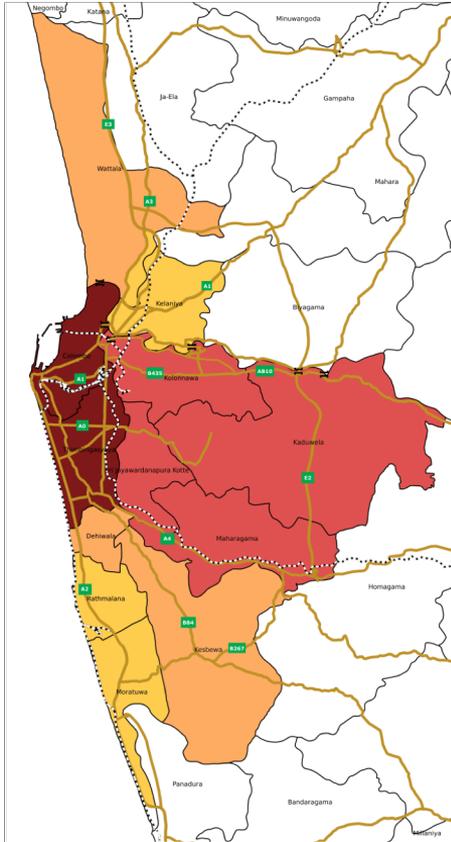


Using mobile network big data for land use classification, Kaushalya Madhawa, Sriganesh Lokanathan, Danaja Maldeniya, Rohan Samarajiva, 2015.

Using mobile network big data to analyze population inflow to Jaffna during the Nallur festival. The estimated origins of these visitors can shed light on the socioeconomic shift during that time.

46.9% of city's daytime population comes from outside.

Potential configurations of a Metropolitan Corporation



Home DSD	Population	Percentage contribution to Colombo's daytime population
Colombo City (2 DSDs)	555,031	53.1
Maharagama	195,855	53.7
Kolonnawa	190,817	3.5
Kaduwela	252,057	3.3
Sri J'pura Kotte	107,508	2.9
Dehiwala	1,37,834	62.6
Kesbewa	244,062	2.5
Wattala	174,336	2.5
Kelaniya	1,887,698	72.1
Ratmalana	95,162	2.0
Moratuwa	167,160	1.8
Total	2,204,015	79.9

CHALLENGE 1: POLICY IMPACT

From supply-push to demand-pull

	Event
2014 Oct	<ul style="list-style-type: none"> • Founding Chair has one-on-one meeting with Secretary, Urban Development → presentation to urban development professionals in November 2014 agreed upon, but postponed due to early announcement of Presidential Election
2015 Jan	<ul style="list-style-type: none"> • Big Data team conducts a public lecture organized by Institute of Engineers Sri Lanka (IESL)
2015 Feb	<ul style="list-style-type: none"> • Email contact made with new DG of UDA with offer to brief on LA's ongoing research (meetings planned but don't happen) • First media interactions in Sri Lanka
2015 May	<ul style="list-style-type: none"> • Big Data Team Leader makes 5-minute presentation at Workshop on implementation of transportation master plan for Ministry of Internal Transport organized by UoM's Dept. of Transport & Logistics. Attended by domain specialists, academics, researchers, officials from UDA, RDA, etc.
2015 Jun - Sept	<ul style="list-style-type: none"> • Big Data Team Leader invited to join planning team for the Western Region Megapolis Planning Project to provide insights from MNBD. Our name suggested by one of the attendees in the May 2015 event, who was appointed to lead one of the committees working on the WRMPP • In total 9 meetings were attended, culminating in a presentation to all the committees on insights from LIRNEAsia big data research related to urban and transportation planning
2015 Aug	<ul style="list-style-type: none"> • Big Data Team Leader presents at Workshop on Integrated Land Use Transport Modeling Practices in Sri Lanka and around the World organized by UoM's Transportation Engineering Division. Attended by domain

Policy Enlightenment/ Supply-push



Demand-Pull





Sunday Times 2

Sunday April, 12, 2015

Big data can make South Asian cities smarter

Big data analysis can help citizens make smart choices and plan cities, says Nalaka Gunawardene

View(s):

With more than half of humanity living in cities, there is an urgent need to improve urban planning, design and management.

Until now, policy makers and planners have struggled to keep up with trends. Changes were too fast, and variables too dynamic, for conventional surveys or censuses to capture them adequately.

Other Articles

[America](#)

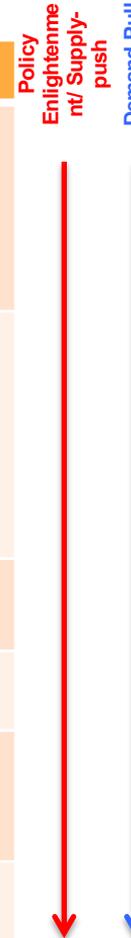
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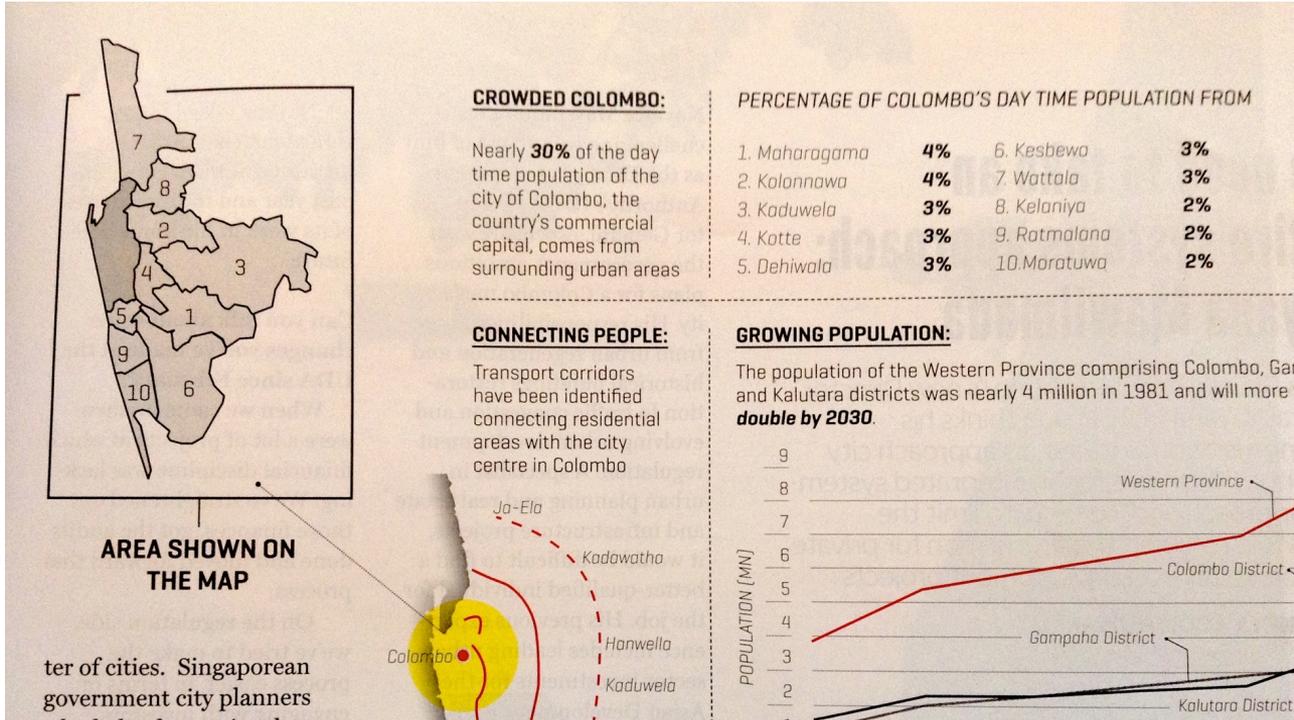
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From supply-push to demand-pull

	Event
2015 Sept	<ul style="list-style-type: none"> • Big Data Team Leader attends launch of World Bank Report on “Leveraging Urbanization in South Asia” • Side discussions with DG of UDA on LIRNEasia’s ongoing research leads to one-on-one meeting with DG the following day to brief him on LIRNEasia research
2015 Dec	<ul style="list-style-type: none"> • UDA, UDA’s Professionals Association, & Young Planners Forum of Institute of Town Planners, Sri Lanka organize special session for LA to present ongoing research. • Echelon Magazine report on Megapolis plans include charts given by UDA on source locations of Colombo’s daytime population developed by LIRNEasia (without acknowledgement)
2016 Jan	<ul style="list-style-type: none"> • Big Data team invited to make presentation to Sri Lanka Strategic Cities Development Project working on Kandy
2016 Feb	<ul style="list-style-type: none"> • DG UDA requests additional mobility and land-use insights on Kandy
2016 Feb	<ul style="list-style-type: none"> • Sri Lanka Strategic Cities Development Project reaches out to LIRNEasia for insights on foot traffic in Kandy. Our data not suitable but we brainstorm possible methodologies
2016 Aug	<ul style="list-style-type: none"> • UDA requests additional finer-grained mobility insights for specific areas in Western Province



Western Regional Megapolis Project (WRMP)



Source: Interview with Western Region Megapolis Authority in Echelon magazine (December 2015, pp. 63)

Lessons

- No demand for insights when we started in 2012; but had we not started on the research when we did, no results would have been available when the policy window opened
- Given difficulty of assessing quality of big-data research, the credibility of LIRNEasia has been of value
 - More work needs to be done to make potential users of this research more knowledgeable
- Supply-push approach helped create the conditions for essential demand-pull
 - However, political changes and appointments which were outside our control were critical in creating demand

CHALLENGE 2: HUMAN RESOURCES

Data scientists are in short supply; Needed are multi-disciplinary teams

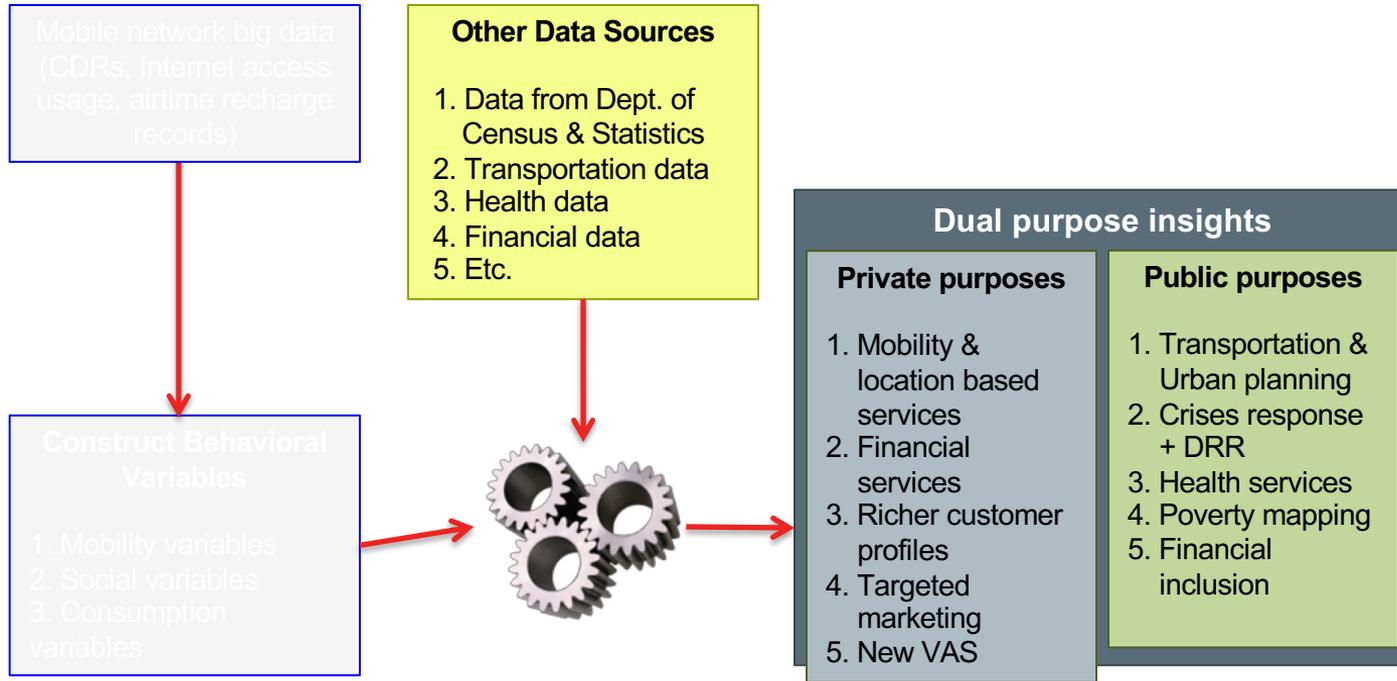
- We prioritize analytical thinking over knowledge of big data tools in our recruitment interviews
- Team members have different specialties
 - Staff and collaborators have a mix of computer-science skills, statistics, and domain knowledge

Flow through: We're always hiring

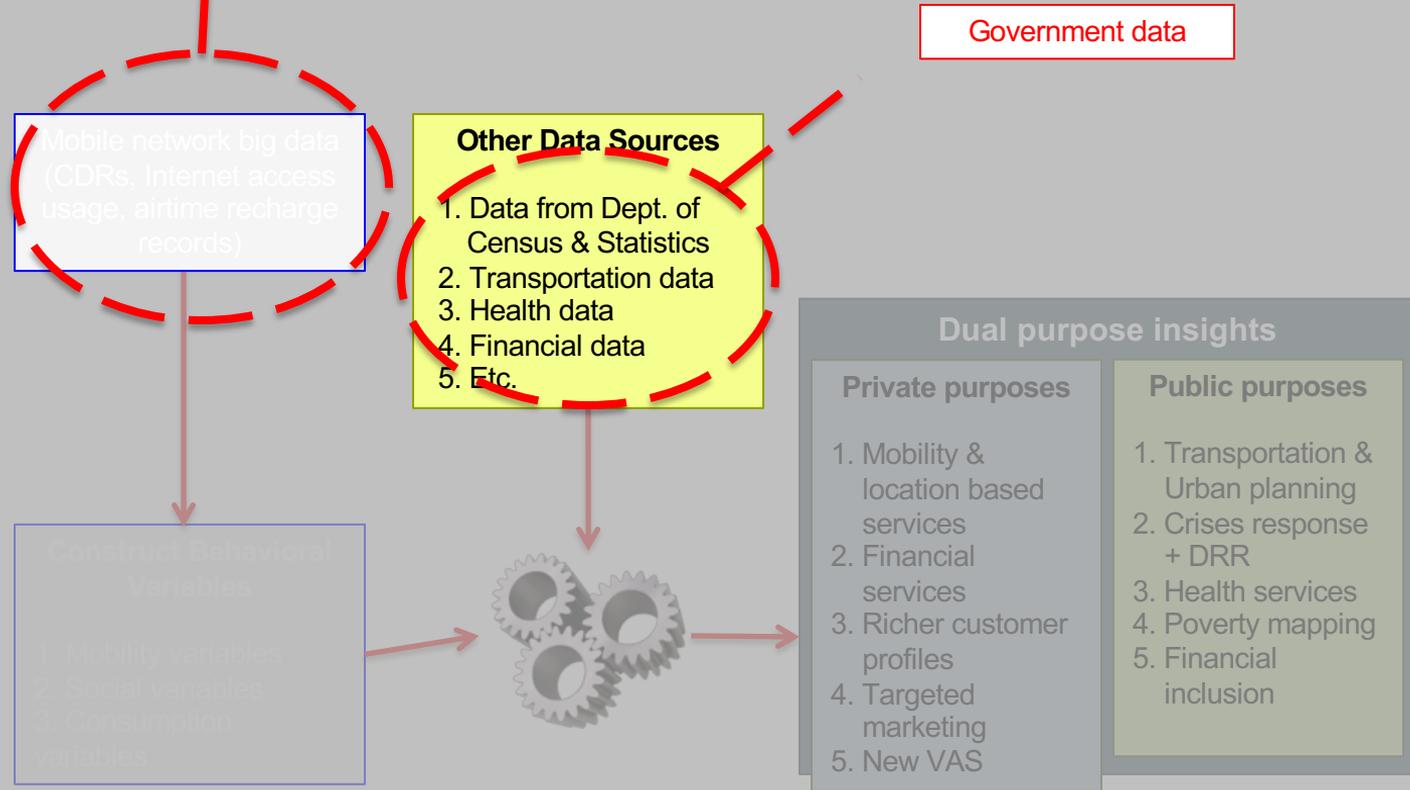
- A computer-science graduate does not think of working in a think-tank; often looking to join a software firm
 - LIRNEasia has done presentations in public forums and at universities to broaden horizons
- Key selling point is the work that we do and our partnerships
 - Rewarding to see research being used
 - Good opportunities for publication and conference papers
 - LIRNEasia encourages individual researchers to build their “brands”
 - Ideal for admission into good PhD programs; current funded placements
 - U Oregon
 - U Michigan
 - Tokyo Institute of Technology
 - U New South Wales

CHALLENGE 3: DATA

Mobile network big data + other data → rich, timely insights that serve private **as well** as public purposes



Mobile network big data + other data → rich, timely insights that serve private as well as public purposes



Mobile network big data

- No established process exists, therefore prior relationships matter
- Basic process
 1. Obtain in-principle agreement from CEOs of companies, ideally at least two
 2. Painfully negotiate specifics with 2nd and 3rd tier management (~ 6 months)
 3. Approach other operators
- Throughout, mutual benefits emphasized
 - Methods for deriving public policy insights can also be adapted for commercial purposes