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Jayachandran/Mint

The 21st century race to map India

10 min read . Updated: 26 Nov 2019, 11:10 PM IST

Srishti Choudhary

Nearly 200 years after George Everest's survey, a digital redo is on the cards. How will it change the country?

A highly accurate, free-to-use map layer, which is available in the public domain, can be a game changer. A McKinsey report says land market distortions in India lead to a GDP annually

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NEW DELHI : It has been nearly three years since Suresh Kumar, a 28-year-old IT engineer from Noida, visited a family-owned patch of land in his ancestral village in Narwana, which is roughly 170km away from Delhi. "Frankly, I do not even know if the land is still ours," he says. "Maybe it has been encroached upon."

Kumar's expression of an odd helplessness, fuelled by doubt, is such a common occurrence in India that Bollywood plot lines have built satirical comedies around it. The unique difficulties and dilemmas of men like Kumar also grabs the World Bank's attention every year via the Ease of Doing Business rankings—which records that despite rapid improvements on several other counts, India languishes at 154th in the world on the "registering property" metric.

In large parts of the country, nobody knows for certain who owns what. Land disputes inevitably clog up an already overburdened court system. Ownership and address have also become important for an entirely unrelated reason. More than 5 million e-commerce packages are expected to shuttle across the country every single day by 2020, according to RedSeer data. Without good spatial data, how will these be delivered?

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"We currently do not have the requisite map data in digital form, which is of high quality and accuracy. The country needs this digital data and we cannot afford to wait anymore," says former surveyor general of India, Swarna Subba Rao.

A highly accurate, free-to-use map layer of the country which is available in the public domain can be a game changer. According to a report by McKinsey Global Institute, land market distortions in India lead to a 1.3% loss in GDP annually. This amounts to $34.45 billion each year.

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On top of that, every private entity and state government has an in-house mapping effort. Flipkart, for example, uses machine learning to convert addresses into sub-regions, which are essentially neighbourhood names suggested by field executives, says Mayur Datar, chief data scientist at the e-commerce firm. "Addresses in India are very hard to determine unlike other countries," he says.

A national base map layer will, thus, limit the need for multiple parallel efforts and transform everything from disaster relief to delivery of goods. The question is: will India's notoriously statist establishment begin to view the humble map as a public good that should be freely available? And will the secrecy around spatial ... way for a plan like the one unveiled by the UK, whose SOI-equivalent, the ... Survey, announced in 2018 to make taxpayer-funded digital maps freely ... businesses and citizens?

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The project

SOI's plan is to develop a high-resolution 1:500 Geoid model of the country. That essentially means 1 cm on the map will represent 500 cm on the ground, which is roughly equivalent to showing the boundaries of each house.

Like the decades-old revenue maps, these maps would show the details of village boundaries, canals, agriculture field limits and roads, with a high accuracy of 10 cm, which is critical for land records. Compare this with the present topographical maps available in public domain, which are at a scale of 1:50,000.

The project has already begun in three states—Haryana, Maharashtra and Karnataka — and about 300 drones are expected to be roped in. The deadline: 2021.

"For the first time, we will know the exact boundaries of the land," said Lt General Girish Kumar, surveyor general of India. "Today, people have their khasra (survey) number, but have no idea where this khasra (survey) number is located. This will enable them to check their land boundaries and ownership online, rather than depending on the patwari. It will (also) facilitate the registry and transfer processes."

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Till now, the limited efforts to improve India's maps have largely focused on urban areas, where most businesses generate their revenue, and swathes of rural areas have remained unmapped, especially the abadi (habitation) areas in a village, which have traditionally not been seen as a source of revenue and, till date, have no formal address system.

"We carried out a pilot project in Maharashtra last year and realized that most people living in abadi areas have no ownership records," says Gireesh Kumar. "But based on our survey, the government gave ownership cards to citizens, which allows them to buy/sell that land and even take loans. This could transform the economy, because the government will also get fixed revenue, which was not coming in till now."

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The move could also bring greater transparency into land acquisition pro could potentially help deal with encroachments across cities, especially t government land.

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But as Naveen P. Francis, an open street mapper from Kerala, highlights, the process of getting a useable official map is incredibly tedious. "Everything in India is copyrighted or licensed and that's where the problem lies in terms of data sharing," says Francis, who was actively involved in creating maps for Kerala during the 2018 flood relief effort.

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"Each government department, be it IT or SOI, have their own map data, which they do not readily share with individuals. And they usually share it in PDF format which is not readily usable," he says.

While the defence services remain the core client of government-generated data, the demands of the fast-growing commercial sector have been largely ignored. "Only whatever SOI thinks is not classified is shared with the public because they are not really looking to address (the) everyday needs of people," adds Francis.

This led to the emergence of an open-street mapping movement in the country in early 2007, when youngsters armed with GPS sensors and internet began mapping their local areas using the Wikipedia-like user-generated "OpenStreetMap" (OSM).

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Creating our own maps

Arun Ganesh, an engineer from Chennai, was among the first few in India to actively lead this volunteer project. For him, it began with mapping the public transport system in Chennai and Mumbai, and then, the entire country.

"OSM was a blank space for India. We are pretty late, but we are now trying to catch up with rest of the world," says Ganesh, who is now working as a digital cartographer with Mapbox in Washington, US. "Our basic understanding of maps is limited to Google Maps, mostly through Uber/Ola or delivery apps. But, as a nation, we cannot be dependent on other countries for our mapping data. Other countries like the UK have made giant leaps in making this data open."

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OSM is a collaborative volunteer project to create crowdsourced editable can be freely used and shared by anybody under an open licence. Since th accessible, they are particularly attractive to startups who shift from Goo order to cut down costs.

change dramatically within a few years.

Reliance on Google Maps

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The Indian government has also begun to realize a pressing internal need for good spatial data. While we may rely on Google to help us navigate across cities and states, the data may not prove very helpful for governments across the country when they have to plan an infrastructure project or build a new railway line. The new survey will solve that problem.

SOI's plan also involves creating a complete 3-D model of cities, which would include details about the altitude above sea level of each point—an important input for planning a city's drainage profile. When integrated with weather forecast, this could help India Meteorological Department to provide impact-based forecasts ahead of severe rainfall events.

"It is the biggest challenge because there is no proper and accurate data on height. Once we have a 3-D model of the city, we can plan our drainage also, especially when there is a threat of inundation in the near future due to a changing clim... Also, tomorrow, if autonomous vehicles are to be introduced in the coun... would need a high level of accuracy, which can come from these maps," s... Kumar.

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As a preliminary step towards achieving these diverse goals, SOI has established about 2,500 ground control points that are uniformly distributed throughout the country, whose standardized coordinates (latitude-longitude) are known. But to provide online positioning with the desired accuracy, SOI would set up an additional 700-1,000 continuously operating GPS reference stations, at a distance of 50-60km from each other. Then, professionally operated drones would cover the remaining gaps.

Close

For now, the plan is to make the data public, and charge a small for commercial use. "Earlier, we used to sell the data. Now, we are going to make it available for everyone through map APIs (application programming interfaces)," says Kumar.

Race of private players

For a long time, India's business ecosystem heavily relied on Google Maps. But with the company capitalizing on its near monopoly in the market with hefty charges, which were increased further in 2018, businesses are now increasingly scrambling to find alternatives.

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"We began creating digital maps of the country 25 years ago," says Rohan Verma, chief executive officer of MapmyIndia. "It began with Coke, which wanted to mark its distributor territory clearly on a digital map when it was trying to expand in the Indian market."

Nothing much has changed since those early days in the shadow of India's liberalization, says Verma. Public maps are still of poor quality, forcing businesses to find private hacks. Which is why SOI has increasingly come under pressure to release its data. "Data is an asset. So, it is not just a question of transparency, because it can also lead to new revenue generating strategies (for the government)," says Anant Maringanti, director of Hyderabad Urban Lab Foundation, an interdisciplinary research and action initiative based in Hyderabad.

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For long, the government has looked at this data purely through a political/security lens and public institutions do not know how to hold on to these assets and release them strategically in order to earn royalty for the exchequer, he says. Geospatial data can transform governments, businesses, and communities for the better, says Maringanti and adds that this is an area of policymaking which has just not taken off in India.

"The urban landscape sees hundreds of changes every day--roads, busine restaurants, ATMs--and maps need to be updated daily, or they lose valu

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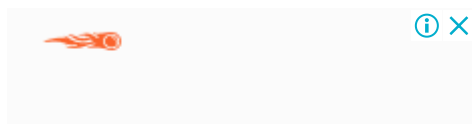
data.

Caught amid this jumble of competing interests and policy failures is the Indian citizen. Come 2021, after an estimated ₹500 crore is spent on a mammoth mapping exercise, will things materially change for her? Will land records improve?

Much will depend on whether SOI keeps its promise of making the data usable and publicly available. Businesses are already beginning to make plans. "Spatial data is a gold mine and we need this," says Vishal Agarwal, a GIS (geographic information systems) expert from Mumbai and founder of startup Spatial Ideas. One measure of the extent of India's still-nascent promise of liberalization may be in the maps that ultimately tumble out of government control in 2021.

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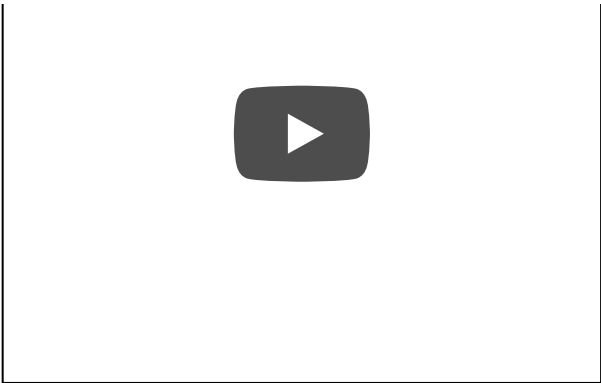
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Airlines face tough winter as hoped-for pick-up fails to materialise

3 min read   10:42 AM IST

One of the biggest disappointments has been the absence of highly lucrative business class travellers

The industry as a whole is hoping that the introduction of airport testing systems will restore passenger confidence

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Why people pay hundreds of dollars to eat on grounded planes

3 min read   01:38 PM IST

The airline can then hook potential travelers with their service and product offerings once travel rebounds

There are also novelty-seekers wanting to try business class or suites who may otherwise not be able to afford the premium cabin experience in the air

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You can order Aadhaar PVC card even if your mobile is not registered with UIDAI

1 min read   02:11 PM IST

The new Aadhaar PVC card comes with enhanced security features like QR code photograph, hologram, ghost image

UIDAI has made provisions for Aadhaar card holders to order the new Aadhaar P your mobile number is not registered

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China is an elephant in the room as a result of US policies: Kanwal Sibal

8 min read   12:40 PM IST

What US policy on China will be after the coming presidential election will certainly have an impact on how India will handle China

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Doordarshan to broadcast live 'Ram Leela' from Ayodhya

1 min read   07:29 AM IST

The Ram Leela is also being broadcast live on the internet on YouTube, and other social media channels of the government

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RDIF inks pact with Mankind Pharma for marketing Sputnik V vaccine

2 min read   12:53 PM IST

The pact with Mankind Pharma is expected to supplement the one with Dr Reddy's Laboratories, but unlike Dr Reddy's, Mankind will not be conducting the clinical trials

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BrahMos supersonic cruise missile successfully test fired from INS Chennai

1 min read   01:14 PM IST

BrahMos supersonic cruise missile hit the target successfully with pin-point accuracy

The highly versatile BrahMos has been jointly designed, developed and produced by India and Russia

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PM Modi to deliver keynote address at Grand Challenges Annual Meeting on Monday

1 min read   06:40 AM IST

The Grand Challenges Annual Meeting will convene virtually from October 19 to 21

Approximately, 1,600 people from 40 countries will participate in this meeting

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Waterlogging in several parts of Hyderabad after heavy rains

2 min read   10:24 AM IST

The Met office in its forecast for Sunday said light to moderate rain or thundershowers are very likely to occur in some parts of the city

The heavy rains had caused Appa pond to overflow, leading to large-scale flooding in the Gaganpahad area

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Covid-19: India registers 61,871 new cases, 1033 deaths and 72,614 recoveries

3 min read   10:00 AM IST

India stood second behind the US in terms of active cases of covid-19 as well total caseload

Active covid-19 cases in the country stand at 7,83,311, while 65,97,209 people have recovered from the disease so far

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Will think before complaining about electricity services: Mahindra

2 min read   17 Oct 2020

A video of MSETCL's worker clinging on wires at great heights to resolve a line fault near Khandala, led the industrialist to swear on Twitter he'll be more circumspect while complaining about electricity services in the future

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PM Modi reviews Covid-19 situation, preparedness of vaccine delivery

3 min read   17 Oct 2020

PM suggests vaccine delivery system to be developed on the lines of conduct of elections, involving all levels of governments and citizen groups

PM calls upon the scientific fraternity, industry including IT industry and academia of India, to work for the entire mankind

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Dr Reddy's, RDIF get DCGI approval for Sputnik V vaccine clinical trial in India

2 min read   17 Oct 2020

The multi-centre, randomised controlled trial will study the safety and immunogenicity of the vaccine developed in Russia

Dr Reddy's and RDIF, Russia's sovereign wealth fund, had entered into a partnership to conduct clinical trials of Sputnik V vaccine and its distribution in India

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Delhi Metro launches special drive to ensure adherence to pollution norms

2 min read　　11:17 AM IST

As part of the drive, the frequency of the inspections done to check the adherence to the pollution control measures has been enhanced

The drive is being monitored by DMRC's Managing Director Dr. Mangu Singh

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Royal Enfield 'Make-It-Yours' 3D configurator for personalisation launched

1 min read　　16 Oct 2020

RE's configurator tool will only support the Interceptor 650 and Continental GT 650 as of now.

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Delhi: Pay lakhs of rupees in fine for violating pollution control norms

1 min read   17 Oct 2020

The special drive is aiming at curbing the construction and demolition waste-related activities that cause pollution

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'Durga Puja gift': Mamata announces sop for techies ahead of celebrations

1 min read   17 Oct 2020

The chief minister said that they will get several benefits with this announcement, including job certainty till the age of 60.

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India's blanket ban on import of ACs to hit China, Thailand

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Bonds shrug off govt plan

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On 9 October, Reserve Bank of India governor Shaktikanta Das doubled the size of open-market bond purchases and asked traders to consider their "shared responsibility" to maintain a stable market.

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Govt extends 40% discount on cargo movement between India, Chabahar Port in Iran

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The levy of concessional vessel related charges (VRC) will be applied proportionately, subject to vessel loading at least 50 twenty-foot equivalent units (TEUs) or 5000 MT cargo to ShahidBeheshti Port

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New batch of Rafale fighter jets to join Indian Air Force in November

1 min read   16 Oct 2020

With the induction of these aircraft, the IAF would have 8-9 fighter aircraft which will be operationalised within a few days

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Kotak Mahindra Bank offer: Home loans start at 7%, attractive rate on car loans

3 min read   17 Oct 2020

'We are pleased to launch the 2020 edition of Khushi Ka Season, a month-long celebration to cater to all our customers', Shanti Ekambaram, Kotak Mahindra Bank

Ahead of the festive season, the bank offers 50% waiver on the processing fee on car loans and two-wheeler loans

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COVID-19: Herd immunity approach is 'fallacy', scientists bat for lockdowns

2 min read   15 Oct 2020

It is critical to act decisively and urgently, scientists wrote

The authors explained that there is no evidence for lasting protective immunity to SARS-CoV-2 after natural infection

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Govt to revise base year of inflation index for industrial workers

1 min read   15 Oct 2020

The Consumer Price Index - Industrial Workers (CPI-IW) is used as a benchmark for calculating dearness allowance for government employees, dearness relief for pensioners and wages for industrial workers

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Meet Sashidhar Jagdishan, new CEO of HDFC Bank who will take charge this month

2 min read   17 Oct 2020

Fondly known as Sashi, Jagdishan has been a part of the HDFC Bank since 1996

Sashi has played a critical role in supporting the growth trajectory of the bank, the lender said

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PM Modi declares his assets. All about where he has invested his personal wealth

1 min read   16 Oct 2020

PM Modi had ₹31,450 in cash at June-end

PM's savings account balance was ₹3.38 lakh on June 30 against ₹4,143 on March 31, 2019

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Cut-off timing for equity mutual fund purchases back to 3 pm from next week

1 min read   16 Oct 2020

The truncated cut-off time will continue for debt funds and conservative hybrid funds. A copy of the Sebi communication to mutual funds on Thursday was reviewed by Mint

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CBIC advises businesses to rectify GST return filing defaults

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CBIC said that taxpayers with sales above ₹five crore in the previous fiscal are advised to ensure that all their due returns have been filed

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People stand in 1.5 km long queue at 4 AM for Biryani at this Bengaluru eatery

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'Anand Dum Biryani', has been witnessing hundreds of customers queuing up since early morning

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Mumbai local train update: AC train services to start from today

2 min read   15 Oct 2020

Eight of the 10 AC local services will be operated between Churchgate-Virar on a fast corridor, one service each will run between Mahalaxmi-Borivali and Borivali-Churchgate stations

Services on Mumbai suburban network resumed partially on 15 June, authorities have been gradually increasing their frequency

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8 Indian beaches get prestigious Blue Flag certification. Check list here

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A Blue Flag beach is an eco-tourism model endeavouring to provide the tourists or beachgoers clean and hygienic bathing water, facilities, safe and healthy environment

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All-new Aadhaar PVC card: Security features, charges and other explained

1 min read   15 Oct 2020

All-new Aadhaar PVC card is more durable, convenient to carry

The status of the Aadhaar PVC card can be tracked on www.uidai.gov.in

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Loan Moratorium: Implement 'interest waiver' scheme at the earliest, SC to govt

1 min read   14 Oct 2020

The apex court on Wednesday heard a batch of petitions seeking interest waiver during the loan moratorium

The government's decision to waive 'interest on interest' come into effect before 15 November, Solicitor General Tushar Mehta told the apex court

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'Honour in death': Indian Army restores damaged grave of decorated Pak officer

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'A fallen soldier, irrespective to the country he belongs to, deserves respect & honour in death.'

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Indian Railways ticket reservation rule to change from today. Check details

1 min read   10 Oct 2020

Indian Railways will prepare the second reservation charts between 30 minutes to 5 minutes before scheduled/rescheduled time of departure of trains

Ticket booking facility, both online and on PRS ticket counters, shall be available, before preparation of second chart

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Easy to Pitch launches India's first helpline for founders

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Easy to Pitch's exclusive helpline number intends to remove the roadblocks in the journey of inception and success of the start-ups

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Trial run of India's first hydrogen fuel cell car sucessfully conducted

2 min read   11 Oct 2020

Hydrogen Fuel Cell technology uses chemical reactions between hydrogen and oxygen (from air) to generate electrical energy, eliminating the use of fossil fuels

The trials were run on a battery-electric passenger car platform retrofitted with the Fuel Cell Stack

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