People power: how to make India's (and the world's) cities truly smart

Think Delhi or Mumbai are crowded? **You've not seen anything yet**. Smart cities are the only answer to the country's urban population crisis – **but flicking a switch or signing a bill isn't enough**. For city planners in India and across the world, real smartness can only be created through a **community revolution**.

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NEARLY 600 MILLION people will be living in India's cities by 2030 [1]. Rural-to-urban migration has been one of the principal social themes of the country – and indeed the world – over the past decade, and with the city-based services sector predicted to deliver continued growth while farm incomes fall, the trend is set to strengthen still further. For anybody who has visited, let alone lived in one of these teeming metropoleis, this represents a daunting – and even frightening – prospect.

Creating sustainable, smarter urban infrastructure therefore has to be a top priority for India's policy makers, ICT businesses and non-governmental organizations. The government's promised investment of USD 1.2 billion – roughly a dollar for every citizen – in developing smart cities is a welcome start, but given the scale of the issue, much more still needs to be done.

This article will identify the sectors where India's smart city efforts should initially be focused. A new model will then be presented that has the potential to change radically the way India, and the rest of the world, approaches the implementation of smart cities.

LOOKING SMART

Defined at its most elementary level, a smart city is a large urban area that uses data – collected by sensors or digital interfaces and then interpreted through analytics – to improve the quality of life of its citizens. The Western world has numerous examples of cities that have applied this approach to specific aspects of their infrastructure, with Berlin, Chicago and Stockholm just a few of the municipalities that have successfully used data to improve efficiency, minimize consumption and reduce costs.

Debates on this subject in India have so far centered on time and expenditure. It is interesting to note, however, that the necessity of smart cities has not been seriously questioned. Smartness is increasingly – and correctly – seen as a new paradigm for India's city planning and governance processes – a fast-forward button that can help the country accelerate the resolution of some of its most perennial social and environmental challenges, and meet the demands of a resolutely urban future. The following sections examine in more detail the potential of smart cities to address three of these areas, while showing that building a smart city also requires technology to be combined with broader policy actions.

i.) Housing

The contrast between skyscrapers and slums is one of the most distinctive features of the 21st-century Indian city. However, stark economic dis-

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parities are creating the latter much faster than the former, and the country's slum population is predicted to rise from 93.1 million in 2011 to 104.7 million by 2017 [2]. There is already a nationwide shortage of about 19 million dwelling units in India's urban areas [3].

Yet remarkably, around 14 million houses in India are currently lying vacant [4]. In a country where achieving home ownership is almost an obsession, this is a significant anomaly.

A smart database that includes real-time data on property and resident status (empty vs rented, or owned vs residing) and therefore helps city planners and dwellers better match demand with supply would be a relatively straightforward but effective step in the right direction. But this is only part of the solution – new policies to encourage increased rental, smarter land use and better last-mile broadband connectivity should also be part of the discussion.

ii.) Transport

The need for dramatic improvement in India's urban transport infrastructure will be obvious to anybody who has tried to get around one of the country's cities. In fact, the Delhi metropolitan region is estimated to lose more than 420 million man-hours every month due to traffic congestion [5]. At the same time, the potential of sensors, digitization and analytics to ameliorate the situation is equally clear.

On the supply side of the equation, these technologies can be used to adjust transport flows through management of traffic signals in real time, to improve accident response times and for strategic planning of future transport systems based on predictive models. At the public transport level, flexible tolling and integrated fare management all become possible.

However, a smart city should combine these approaches with broader actions on the demand side. Policy makers should create opportunities for people to avoid adding to traffic, such as concessions to encourage movement outside certain hours, increasing flexible road usage, developing policies to stimulate mass-transit usage and even promoting concepts such as 'work from home' or 'work from any device'. These concepts are not yet pervasive in India, and suitable incentives can be built into tax regimes to benefit corporations willing to work more online.

iii.) Utilities

India is the world's fifth-largest producer and consumer of electricity – although 24/7 supply remains a distant reality. Over the past five years, losses in transmission and distribution by India's state utilities have been as high as 30 percent (compared to under 15 percent in developed markets) – which is equivalent to about 1.5 percent of the country's GDP [6]. In addition, there are concomitant issues of over- or undercharging for electricity due to the absence of meters in some areas, and unreliable equipment in others.

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Smart grids that utilize digital two-way communicating meters to control supply and demand while ensuring accurate pricing can play an integral role in improving this situation. Mass deployment of sensors to collect and disseminate data relating to electricity consumption by individual households, manufacturing units and buildings has the potential to form the cornerstone of a new, more efficient system that by automatically sending out bills, functions very much like a post-paid plan for a mobile phone. As well as catering to demand-sensitive networks, automating distribution through digital technologies also enables full synchronization of renewable and non-renewable sources of energy.

Coupled with policy incentives to encourage all buildings to be energy-neutral or energy-positive through offsetting consumption with conservation or production, smart technologies can bring unprecedented economy and efficiency to the Indian electricity sector. In addition to electricity grids, these approaches are equally applicable to India's water and gas infrastructure. It is worth noting that all utilities will do well to pool their smart technology investments, given the similarity of tasks and therefore potential economies of scale. Converged systems should also lead to lower maintenance costs and deliver substantial savings that can ultimately be passed onto the consumer.

AUTHENTICATION FACTOR

Housing, transport and utilities all coalesce into the broader theme of the smart city. In India, these sectors are evolving through parallel narratives – some have reached more advanced stages, while others lag behind. The priority is to bring all the strategies together on a common ground and push for a concerted, properly centralized effort.

Of course, creating smartness is not without challenges. As already discussed, technology implantation is only half the job – wider policy actions are also required, and this can be a highly time-consuming and uncertain process. Substantial volumes of investment and planning must be given the green light based on little more than predictive analysis and relatively thin data.

More trustworthy systems and better security of data assets and information architecture are also needed, given that a simple denial-of-service attack could, in theory, today paralyze a whole city. And the blurring of boundaries between personal and public data necessitates finding a healthy equilibrium between privacy and social interest – excessively tilting the scales one way is the fastest method to make a smart city dumb, while going too far in the other direction is a recipe for totalitarianism.

Responding effectively to these difficult questions is essential to the future of India's smart cities. In some cases, answers remain a long way off. But even assuming they can be resolved, success may yet prove elusive. Governments and industry stakeholders need to recognize that an extra – and often overlooked – factor beyond technology and policy is still required if India is to make its cities truly smart.

CITIZEN GAIN

In its fullest sense, smartness encompasses not only technological transformation and policy action, but a community revolution. Too many urban developments – both in India and elsewhere in the world – are today planned as hardware on a giant scale, and this approach misses the essential point of a smart city. Smartness does not just happen by signing a bill into law or by flicking a switch to turn on a system – it is an ongoing process, which with the right levels of participation from citizens, government and industry, should evolve like a living organism.

Take the example of traffic infrastructure discussed earlier. User participation in collecting and sharing data, when combined with strategic sensor deployment, can be invaluable in building a truly comprehensive and accurate picture of real-time traffic flows. This kind of digital participation automatically combines individual citizens into community associations who play a driving role in managing the workings of a city.

However, at a deeper level the smart city is about more than efficiency or economy gains, important and impactful though they may be. By increasing the availability and transparency of communication layers and networks, which cover citizens' transactions with each other, businesses and government, a smart city – done properly – has enormous potential to increase a society's levels of trust and participation. More information leads to greater trust, which in turn helps citizens make choices that are more participative. This may also represent a partial answer to the privacy concerns raised earlier in this article – when available to everybody in the system and adapted to the established norms of democracy, data can be the springboard for increased dialog between citizens and governments, rather than a tool of top-down Orwellian surveillance.

In short, citizens become active components of the smart city in action – through open networks and responsive systems, their concerns determine the city's priorities and their activism drives its evolution, while providing a vital human face to an all-embracing culture of automation and analytics. This also implies a shift in the traditional relationships between governors and governed. In a truly smart city, government functions less as a prime actor than an enabler and regulator. As citizens become increasingly aware and engaged, the city becomes a thriving partnership – much like a strengthened social contract.

Until India's – and the world's – cities are built

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with these ideas in mind, their smartness will remain strictly limited. And while it is vital that smart cities everywhere develop in this direction, it may be even more critical in India. Strong community ties have always been a dominant thread in the country's social fabric, even in the current era of rapid urbanization, and these bonds must be built into the next generation of cities by default. In addition, every city in India has its own highly distinct culture – Kolkata is definitely not Mumbai, and there is a world of difference between Delhi and Chennai. Such diversity is a source of strength for the country, and preserving this valuable heritage in the face of technology-driven homogenization – while successfully co-opting a new generation of smart citizens – will require close community involvement.

PEOPLE POWER

The very term 'smart city' implies a limitation. In the long term, what India actually requires is a smart society, in which cities, towns and dwellings are all linked together in a grid of cooperation and trust that binds the nation together. Building 100 smart cities – as the government has set out to do – can only be the first step, since a series of smart oases in a vast dumb landscape will benefit nobody.

But whatever route India's journey to a smart society eventually takes, one thing is certain. Throughout the ongoing intertwining of cities with CPUs, communities ultimately hold the key to smartness. The only way to create more participative, adaptive and trustworthy societies is to combine innovative technology and policy with the power of the citizen – smartness can never be unboxed along with a computer or sensor.

This is a lesson particularly relevant in India, but also outside the country's borders. India is increasingly seen as a leader when it comes to cost-effective technology innovation – the Mars Orbiter Mission, built at an enviously low budget of only USD 70 million (the equivalent of a single bus ticket for every member of the country's population), is just one high-profile example [7]. Policy makers and companies from both the developing and developed world should watch with interest as India embraces the smart city. And if a new philosophy of smartness – based on a combination of technology transformation, policy action and strong community involvement – can successfully emerge from this process, so much the better for everyone. ●

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