Consultation on Smart Cities

August 2014
Challenges with the Indian Urbanization Scenario

Urbanization in India is rapid and propels social and environmental challenges. Cities are characterized by strained infrastructure which manifests itself in terms of power cuts and water shortages, high cost of living, and unaffordable real estate resulting in urban sprawl and slums, high volume of traffic resulting in pollution and delays.

Structural Challenges

Unprecedented scale
- Largest urban movement in the world - matched only by China
- >700M new urban residents by 2050
- Multiple models of urbanization

Efficiency in governance
- Limited transparency
- Fragmented accountability
- Incongruent city divisions (e.g. Bangalore has 88 wards for policing, 39 for electricity etc.)
- “Leakage” of resources

Execution Challenges

Predominantly Brownfield
- ~ 60% of urban growth through natural population increase
- Unplanned growth
- ~ 5-10 planned Greenfield projects

High density cities
- Mumbai and Kolkata are the world’s most densely populated cities (~10X New York)
- 5 of the 20 most densely populated cities in the world are Indian

Resources enhancement
- Municipal expenditure only 0.5% of India’s GDP
- Narrow revenue base
- Inadequate capabilities
Framework for Sustainable Urbanization

Merely investing in enhancing infrastructure is not sufficient. Projects that focus primarily on expanding capacity are not necessarily most effective in serving community needs, and neither are they sustainable in the long run.

The absence of a viable business model and oversight would challenge the economic feasibility and effectiveness of such investments. Such projects would constantly require funds and assistance from the government and external agencies, and still not ensure quality. For urbanization to be successful there are three goals that need to be achieved where the benefits have to be:

1. socially equitable
2. economically viable
3. environmentally sustainable

To achieve these outcomes four mandates are required:

1. City Design
2. Business model
3. Governance
4. Infrastructure
Principles for Sustainable Urbanization

City Design
- Transforming an existing city
- Build/transform per-urban cities which are in the vicinity of current cities
- New cities detached from current cities

Brownfield Cities
- Infrastructure changes improve to quality of life
- Brownfield
- Leverage current infra
- No Social/cultural displacement
- Economic independence

Whitefield Cities
- Integrated usage of underused urban land
- Leverage current city infrastructure
- Roadmap for being self-sustained
- Form clusters of discrete economic activity

Greenfield Cities
- Planned, coordinated construction of entire cities
- Clean design for economic character
- City design can accommodate ICT infrastructure

Business Model
- Leverage India’s advantage in shaping economic character of cities
  - ICT centric cities have succeeded in demonstrating strong city economies by building a cohesive integration of technology firms and skilled workforce
  - Effective government policies have supplemented viable business models such as PPPs to not only raise investment but also to increase implementation efficiency of infrastructure projects

Governance
- With the scale of investment required, improvements to governance will be top priority
  - Vital towards building better cities and providing equitable access to all sections of population
  - Appropriate ownership, structure, regulations, policies/oversight should provide a conducive environment for urbanization initiatives and must be based on principles of accountability, enforceability and transparency

Infrastructure
- Efforts should be made to adopt appropriate infrastructure/technical solution to address urbanization challenges
  - In choosing technology solutions, long-term benefits and execution capabilities to be considered
Transition of Successful Urbanization to Smart Cities

The inclination to become a smart city is driven by the inspiration to surpass challenges posed by traditional cities. Overcoming these critical challenges in a systematic manner is critical and necessary for cities inspired to the shift towards more sustainable city development measures among all stakeholders: citizens, businesses and Government. The quality of delivery from foundational elements of traditional cities is enhanced by leveraging technology.

<table>
<thead>
<tr>
<th>Traditional City</th>
<th>Smart City</th>
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<tr>
<td>High power theft resulting in power shortages and intermittent blackouts; Env. unfriendly alternate solutions</td>
<td>Low theft, higher collections for the provider; adequate power supply, no blackouts; lower carbon emissions</td>
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<tr>
<td>Water shortages, timed water supply; revenue losses for the provider</td>
<td>Continuous and round the clock water supply; higher collections for the provider</td>
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<tr>
<td>High congestion, slow moving traffic, high pollution, hard to find parking</td>
<td>Better traffic flow, low pollution, citizen directed to free parking in high traffic areas</td>
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<td>Lack of a unified city view – “always dug up” feeling; unnecessary spend</td>
<td>Unified city view – better planning of city works, lower cost to execute</td>
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<td>Limited record of citizen health history resulting in inaccurate diagnosis; higher costs for operators and insurance providers</td>
<td>Lower instances of medical errors resulting from unavailability of prior information; higher efficiency in hospital operators</td>
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<td>Difficult to access citizen services; Multiple hand-offs/interactions, extensive deals, need the “middle-man”</td>
<td>Simplified and efficient government – citizen/business interactions; lower cost to operate</td>
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<td>Investors unable to get detailed information about the business environment in the city</td>
<td>Higher awareness and dedicated efforts for sustainability through IBMS</td>
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“A smart city is the current megatrend where an Indian city’s sectoral service delivery leverages technology to enrich its resident’s standards of living, provides positive investment climate for businesses, and equips governments to maximize resource utilization and provide transparency”.

Our Shared View for Indian Smart Cities
Elements to Facilitate Smart Cities

Building a smart city requires a system wide view and an integrated approach. High level elements required for a SMART city includes following five layers:

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<tr>
<td>Sensing layer</td>
<td>Sensors or smart devices are located throughout the city to measure, monitor and record desired parameters at the field levels</td>
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<td>Communication layer</td>
<td>Transmits data from sensor layer to the data management layer</td>
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<tr>
<td>Smart City platform</td>
<td>Constitutes data management, open integration architecture system, information security and analytics. This layer helps in creating cohesive information which can be analysed for one of the three purposes: 1) presenting 2) perfecting or 3) predicting. This layer also includes the underlying datacentre infrastructure like servers, storage etc. and common applications like GIS</td>
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<td>Command Centre</td>
<td>Creates the “unified view” for city operations</td>
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<td>Service layer</td>
<td>Touch point between the city administration and its citizens/ businesses</td>
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**Barriers to Commissioning Smart Cities**

*There are certain critical obstacles that must be overcome before transformation into a smart city.*

- **City Planning Regulations**
  - Rigid master plans and restrictive zoning regulations limit the land available for building
  - Regulations that limit urban density such as floor space indexes (FSI/FAR) reduce the number of units raising prices

- **Governance**
  - Current situation of fragmented accountability where cities are also subject to rules and regulations from centre, state and district administration. In addition not all departments that operate inside a city have a central command and often are not harmonized, in addition potential of jurisdictions to overlap

- **Funding**
  - Cities should influence job creating businesses and talented professionals and both groups are increasingly selective when deciding where to establish themselves. They are attracted to cities that have an absorbing vision for a better future and a path to get there and this requires a supporting policy framework and appropriate commercial constructs to enable private sector participants to recoup investments and professionals to move in

- **Nature of ICT Investments**
  - Current city investments are undertaken by separate departments as a result each department designs projects focused on solving their problem with limited view of the overall implications across technology initiatives of other departments.
  - Lack of a Unified View of the entire city leads to operational inefficiencies and makes cities less resilient during times of emergency due to real time availability of cohesive information, better resource allocation and infrastructure management.
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