

# BerkeleyHaas Case Series

Haas School of Business  
University of California Berkeley

## Smart Cities - Indian Approach to Urban Development

**DRAFT**

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Date: Sep 10, 2015

“Initiatives to set up 100 Smart Cities across the country by 2022 are underway and being implemented at a fast pace.” - Venkaiah Naidu, Minister of Urban Affairs, Republic of India

### **The Challenge**

Take part in the opportunity of a lifetime and challenge of the year! Join the Prime Minister of the world’s largest democracy and help him build his dream project – 100 Smart Cities by the year 2019.

In early 2014, Mr. Narendra Modi, the Prime Minister of India promised he would build 100 Smart Cities in the next 5 years. One year later, the Government of India has yet to help strategize for implementation and identify cities that will become Smart Cities.

Participate in the challenge, and advise the Prime Minister of India on a strategy to achieve his mandate.

Your contribution can have a powerful impact. These cities have the potential to become models for future social and economic development in India. Help him establish his credibility by honoring the commitment of building 100 Smart Cities.

India wishes to achieve the Prime Minister’s vision of establishing 100 Smart Cities in 5 years through managing the challenges of economic, social, cultural habit & value diversity.

### **What is a Smart City?**

People migrate to cities primarily for employment. They need good quality housing, and cost-efficient physical and social infrastructure such as water, sanitation, electricity, clean air, education, health care, security, entertainment, etc. Industries are also located in cities because there is an agglomeration of economies that provide easy access to labor and other factors of production. Good infrastructure, comprised of simple and transparent online processes, makes it easy to establish an enterprise and run it efficiently - which are important features for an investor.

Smart Cities combine the use of technology and information with the existing and planned infrastructure investment to: improve citizen's quality of life, optimize the use of their resources, and to promote investment and government transparency. Smart Cities function as holistic entities with partnerships outside their ecosystems that enable them to create value, capture value, and sustain themselves to remain relevant to its citizens, investors and the planet.

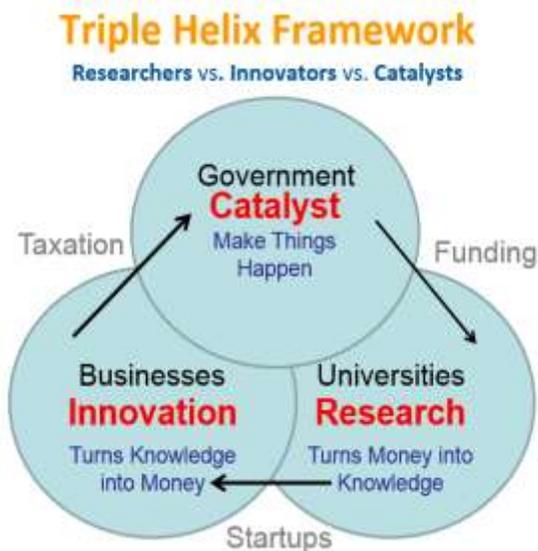
A good model does four things:

1. Saves time and costs for the individual customer, as well as the entire ecosystem – wasting one person's time has a domino effect on the entire ecosystem. It is no longer about creation of a Minimum Viable Product or Service – it is about creating a Minimum Viable Ecosystem. It is not about shifted costs from one entity to the next – but eliminating them entirely from the ecosystem.
2. Deliver value in context of the customer's specific need in real time : when, where, and how. Format and context matters.
3. Offer value at price points that the citizen can afford – this is critical as 6 billion poor people in the world are left out of the equation – models that create value only for the 1.5 billion rich people will soon fall apart.
4. Adapt to changes as they happen in real time and keep pace with new innovations.

This is a tall order - it cannot be met through human cranial capabilities alone. Assistance is needed from a repository of collective knowledge and wisdom of the ages, as well as a system with cognitive computing capabilities to support individual and collective decision-making. This will add value to the ecosystem in which businesses operate.



According to the Triple Helix Model, government entities have a key role to play in stimulating the economy as “first movers” (shown in the diagram). This allows for efficient and holistic growth in creating value for their whole ecosystem.



The model was first introduced by Professor Henry Etzkowitz of Stanford University. His research has shown that all three circles within the triple helix will need to play an equal role to foster a healthy system.

Etzkowitz states that the model falls apart when one sector dominates —all three circles will need to equal for optimization.

## The Need for Smart Cities in India

### **Exhibit 1 – Building Sustainable Indian Cities<sup>1</sup>**

Urbanization is critical to India’s development – by 2030, India’s GDP will multiply 5 times the amount it is today. The five building blocks of sustainable urban living in India is unlocking \$1.2 trillion in: 1) urban investment; 2) empowering city administrations; 3) planning; 4) affordable housing for all; and 5) shaping a land of 6,000 cities. India will facilitate a debate on reform and make change happen in a way that involves all key stakeholders—citizens, the private sector, and governments (national, state, and city).

“India: Surging to a Smarter Future”<sup>2</sup> a paper published by FICCI & PWC in 2015 brings out the perspective of urbanization in India and the need to create Smart Cities.

The Government of India set up an Urban Development Steering Committee to make recommendations for inclusion in the **12<sup>th</sup> Plan document<sup>3</sup>**.

The committee report dated October 4, 2011, identified the following **Key Problems in Urban Planning**:

- a) Lack of comprehensive planning approach
- b) Rigid planning process
- c) Lack of Plan-Finance linkage
- d) Inadequate institutional clarity
- e) Lack of capacity & enabling tools

The report also delineated the following **Principles of Urban Planning Strategy** for implementation by end of the 12<sup>th</sup> plan:

- a) Smart growth of new cities
- b) Strategic densification of existing cities
- c) Cities for generation of economic growth momentum
- d) Inclusive growth
- e) Integrated land use and transport planning

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<sup>1</sup> India's urban awakening: Building inclusive cities, sustaining economic growth, McKinsey Global Institute, 2010, [http://www.mckinsey.com/insights/urbanization/urban\\_awakening\\_in\\_india](http://www.mckinsey.com/insights/urbanization/urban_awakening_in_india)

<sup>2</sup> India: Surging to a Smarter Future, FICCI & PwC, 2015, [http://www.pwc.in/en\\_IN/in/assets/pdfs/publications/2015/india-surging-to-a-smarter-future.pdf](http://www.pwc.in/en_IN/in/assets/pdfs/publications/2015/india-surging-to-a-smarter-future.pdf)

<sup>3</sup> 12th Five Year Plan Document, 2012, <http://planningcommission.gov.in/plans/planrel/12thplan/welcome.html>

## **Exhibit-2 – India: Surging to a Smarter Future<sup>4</sup>**

India has a population of around 1,250 million and occupies around 1,269,346 sq miles. It is the 7<sup>th</sup> largest country in the world. India has 29 states and 7 union territories. Its population is comprised of people from several religions and casts who speak 22 Indian Languages with a sex ratio of 940 females per 1,000 men.

India currently has around 31% of its total population in urban areas, which contributes to over 60% of India's GDP. It is projected that by 2030, the Urban Population would contribute to 40% of total population and the contribution of urban population to GDP would go up to 75%. It is in this context that the Government of India has placed focus on Urban Development.

Recognizing that Smart Cities are engines of Growth and draw millions of people from rural and urban areas, the Government of India decided to promote cities that provide a core infrastructure and offer quality of life to its citizens - a clean and sustainable environment with state of art technology based on smart solutions.

## **Exhibit 3 - Guide to India Smart Cities<sup>5</sup>**

This concept note gave the context, components and services of a Smart City, financing and operational aspects. The concept note was placed on the website<sup>6</sup> of Ministry of Urban Development inviting suggestions and comments from all stakeholders. A series of discussion meetings were held to deliberate on the suggestions received culminating in the finalization of a Mission Statement and Guidelines by the Ministry of Urban Development, Government of India in June 2015.

### **Smart City Plan:**

The time has arrived for India to transform its cities into Smart Cities and achieve its vision of smart urbanization. In January 2015, the secretary to the Ministry of Urban Development (MoUD) stated that the Indian government's mission to produce 100 Smart Cities across the country is a national priority. The Smart City vision encompasses achievements of three goals: 1) social equitability; 2) economic viability and 3) environmental sustainability. This document includes current initiatives from various Indian cities and European Union solutions for Smart Cities.

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<sup>4</sup> India: Surging to a Smarter Future, FICCI & PwC, 2015, [http://www.pwc.in/en\\_IN/in/assets/pdfs/publications/2015/india-surging-to-a-smarter-future.pdf](http://www.pwc.in/en_IN/in/assets/pdfs/publications/2015/india-surging-to-a-smarter-future.pdf)

<sup>5</sup> Draft Concept Note on Smart City Scheme, MoUD, Govt. of India, 2015, <http://planningtank.com/wp-content/uploads/2015/06/Draft-Concept-Note-on-Smart-City-Scheme-by-Ministry-of-Urban-Development-MoUD-Govt.-of-India-as-on-3.12.2014-.pdf>

<sup>6</sup> Ministry of Urban Development (MoUD), Govt. of India, <http://moud.gov.in/>

Smart Cities in India are built upon the following features – Economic Infrastructure, Institutional Infrastructure, Physical Infrastructure, Social Infrastructure, and Cross-cutting features (minimizing waste, financial sustainability, energy efficiency, demand management, improved access to information). The use of clean technologies, information and communication technology (ICT), participation of the private sector, citizen participation, and smart governance are all components that make Smart Cities possible. The annex includes: the Definition for Smart Cities, Pillars of Smart Cities, Benchmarks for Smart Cities, Financial Architecture for Smart Cities, Smart City Reference Framework, and Implementation Framework.

#### **Exhibit-4 India's Smart Cities Mission & Guidelines<sup>7</sup>**

For the economy of every nation, including India, cities are engines of growth. With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. Thus, comprehensive development of physical, institutional, social, and economic infrastructure are important in improving the quality of life; attracting people and investments to the City, and setting in motion a virtuous cycle of growth and development – Smart Cities is a step in that direction. The mission statement and guidelines document describes the features of Smart Cities, city selection procedure, funding, time frame and monitoring mechanism.

##### **a) Key Features of Smart Cities:**

1. Public Information	8. Waste Water to be Treated	15. Energy Efficient & Green Buildings
2. Electronic Service Delivery	9. Recycling and Reduction of C&D Waste	16. Smart Parking
3. Citizen Engagement	10. Smart Meters & Management	17. Intelligent Traffic Management
4. Citizens- City's Eyes and Ears	11. Leakage Identification, Preventive Maintenance	18. Integrated Multi-Modal Transport
5. Video Crime Monitoring	12. Water Quality Monitoring	19. Tele- Medicine Tele Education
6. Waste to Energy and fuel	13. Smart Meters and Management	20. Incubation/ Trade Facilitation Centers
7. Waste to Compost	14. Renewable Sources of Energy	21. Skill Development Centers

<sup>7</sup> Mission Statement & Guidelines, MoUD, Govt. of India, 2015, <http://smartcities.gov.in/writereaddata/SmartCityGuidelines.pdf>

**b) Selection:**

100 Smart Cities have been selected based on urban population of the State/Union Territory with each State/UT having at least one Smart City for implementation during (2015-2019) – See **Exhibit 5**<sup>8</sup>

The selection process is comprised of two stages: 1) a shortlist of cities by the states, and 2) at the level of center, all proposals received from States/UTs are evaluated on the basis of model chosen, whether retrofitting/redevelopment/green field development/mix, etc.

**c) Implementation:**

The implementation of Smart City Mission for developing 100 Smart Cities is proposed to be done by creating Special Purpose Vehicle (SPV) for each city. The SPV is expected to plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City Development projects.

**d) Financing of Smart Cities:**

- Central Government has released 48000 crores over five years i.e. 100 crores per year. A matching amount is expected to be contributed by State Government/ULB.
- A number of State Governments have set up financial intermediaries to tap funds.
- Central and State Govt. funds would meet only a part of the Smart City Cost. Balance Funds are expected to be mobilized from:
  - a) Funds from collection of user fees, beneficiary charges and impact fees, land monetization, debt, loan, etc.
  - b) Through Municipal bonds, pooled finance mechanism, Tax increment financing etc.
  - c) Funds available in other central Govt. Schemes.
  - d) Leverage borrowings from financial institutions, including bilateral/ multilateral institutions both.
  - e) Private sector through PPP (Public-Private Partnership).

**Exhibit 6 – Smart Cities Finance Guidelines**<sup>9</sup>

The qualification process for Public-Private Partnership (PPP) projects includes an application, bids, and required documents, such as the Request For Proposal (RFP), evaluation, Approval for PPP projects, and sources of funds for the Special Purpose Vehicle (SPV) to be created for each Smart City proposed by Government of India. The document outlines detailed guidelines for evaluation, fraud and corrupt practices and format for all applicable forms.

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<sup>8</sup> List of 98 Cities selected under Smart Cities Mission, MoUD, Govt. of India, 2015, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=126384>

<sup>9</sup> Request for Qualification, MoUD, Govt of India, 2014, [http://planningcommission.gov.in/sectors/ppp\\_report/2.Model%20Bid%20Documents/01-A%20Model-RFQ-Word.pdf](http://planningcommission.gov.in/sectors/ppp_report/2.Model%20Bid%20Documents/01-A%20Model-RFQ-Word.pdf)

## **Suggested Financial Architecture for Smart Cities:**

The management of Smart Cities (SPV) will consider the following options to funding Smart City projects:

- a) Funding from multiple government agencies and departments
- b) Use credit rating, project sustainability of investment performance to borrow from financial institutions.
- c) Use charges for utilities
- d) Land value based taxation
- e) Indian foreign investors
- f) Borrowing from Multilateral agencies
- g) Pooled Municipal Debt Obligation
- h) Real Estate Investment Trusts
- i) PPP Model
- j) Bonds

### ***Time Frame:***

The overall time frame for development of 100 Smart Cities across the country is 5 years. However, each city/project would have its own plan for implementation and completion of project, depending upon its proposal and coverage.

### ***Monitoring:***

100 Smart Cities will be developed by respective SPV management, Smart City Advisory Forum, and representatives from various stakeholders for each Smart City project. All Smart City projects with a state shall be done by a state level High Powered Steering Committee, and have a representation of various stakeholders at state level while monitoring all 100 Smart City projects i.e. the mission would be done by an apex committee representing various stakeholders.

## **Exhibit 7 – Facilitating Implementation of 100 Smart Cities in India<sup>10</sup>**

A Smart City is one which leverages traditional (i.e., water supply) and modern (i.e., ICT) enablers to fuel a sustainable economic development, to ensure high quality of life and better management of natural resources. An integrated smart city framework comprises of Smart Governance, Smart Living, Smart People, Smart Mobility, Smart Environment, and a Smart Economy. Although select cities in India exhibit smart solutions, the challenge is to replicate these solutions on a larger scale to formulate strategies for quick implementation.

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<sup>10</sup> 100 Smart Cities in India Facilitating Implementation, Deloitte, 2015,  
<https://www2.deloitte.com/content/dam/Deloitte/in/Documents/IMO/in-imo-smart-cities-in-india-noexp.pdf>

### **Key Implementation Issues:**

Deloitte published a report '100 Smart Cities in India Facilitating implementation' in Feb 2015 highlighting key implementation issues. *Exhibit 7*. The key issues identified are:

- a) Developing a Green Field Smart City would require financial investment of 75K to 150K crore
- b) The implementation time is approximately 8 to 10 years
- c) Tariff structure will have to be designed to enable the cost recovery
- d) ULB's will have lack of technical capacity to ensure a timely and cost effective implementation
- e) Need for coordination among central/state agencies and other stakeholders for financing, sharing of best practices and service delivery process.

### **Criticism of Smart City Mission:**

While there is no formal study available in a public domain on critical review of a proposed Smart City Mission, there are a number of press articles and reports on several aspects of the mission.

- a) Indian Express<sup>11</sup> says that Smart Cities need smart funding options due to huge non-performing assets in the infrastructure sector impinging upon banks and financial institutions to lend more credit to the sector.
- b) In an article published in 'The Guardian',<sup>12</sup> the author has suggested that making 100 Smart Cities would lead to social separation – creating Smart Cities would prohibit many poor Indians from enjoying the privileges of a Smart City infrastructure.
- c) In another write-up in the "The Wall Street Journal"<sup>13</sup> the suggestion made was that India should focus on improving existing cities based on expectations of the people. Smart Cities should aim at job growth, productivity, economic inclusion, sustainability and resilience,
- d) An article in 'Outlook India'<sup>14</sup> suggests that the idea of 100 Smart Cities is both ambitious as well as inadequate considering the population growth. It also suggests that the employment generation, environmental and social criteria, governance and public participation should be taken seriously.

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<sup>11</sup> Indian Express, 2015, <http://indianexpress.com/article/india/india-others/investment-challenge-smart-cities-need-smart-funding-options/>

<sup>12</sup> The Guardian, 2015, <http://www.theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid>

<sup>13</sup> The Wall Street Journal, 2015, <http://blogs.wsj.com/indiarealtime/2015/01/30/is-india-ready-for-smart-cities/>

<sup>14</sup> Outlook India, 2015, <http://www.outlookindia.com/article/are-100-new-smart-cities-smart-policy/293100>

### **Economic Value Proposition:**

Building Smart Cities is expected to offer better and more sustainable lifestyle to citizens through:

- a) Optional usage of resources
- b) Connected and transparent public services
- c) Better safety and security
- d) Enhanced quality of life

With an estimated cost of 75k to 150 k crores per Smart City, these would be a huge business opportunity for all stakeholders including professionals, manufacturers, contractors, workers, and service providers in the construction phase and huge employment services and investment opportunities once the small cities become operational.

The Smart City Mission is expected to benefit India through:

- a) Reduction in energy consumption for transportation, electricity, water, security services from technology/smarter solutions.
- b) Massive FDI investment
- c) Higher GDP through tourism and increased industrial/commercial activity.
- d) Sustainable development and better quality of life from better environment, health, waste management, transportation, etc.
- e) Increased education and employment opportunities

Development of Smart Cities would lead to better quality of life, crime prevention, better health through climate change, and benefits in productivity such as efficiency, energy savings, climate change, etc.

There would be a huge increase in GDP through business activity and commercial opportunities.

### **Convergence with other Govt. Schemes:**

The Smart Cities development follows an area-based strategy. Each city can derive benefits by seeking convergence of other Central/State Govt. Schemes/programs with Smart Cities mission – i.e. AMRUT, Swachh Bharat Mission, HRIDAY, Digital India, Skill Development, Housing for all and projects of Ministry of Health, Education, Literacy, etc.

## **Exhibit 8 – Smart City Maturity Model (SCMM)<sup>15</sup>**

Despite a plan for rapid development of 100 Smart Cities by the Government of India, there is limited understanding of how technology-enabled solution(s) will help a city evolve into safe, secure, and efficient urban cities—after all, one solution would not fit all regions. The Smart City Maturity Model (SCMM) is a tool for benchmarking an effective design for Smart Cities. This tool is a technology readiness assessment that implements a solution uniquely aligned with each region’s (city or state) resources and capabilities. In a general sense, the SCMM Framework consists of two parts – an Assessment Framework and a Solution Framework.

Professor Deepa Mani and Professor Sandeep Banerjee of ISB, Hyderabad, have published a paper titled “**Smart City Maturity Model**”. This paper describes a tool for benchmarking and design of Smart Cities. The framework, the Smart City Maturity Model (SCMM) helps in assessing technology readiness of any city and implement a solution that is uniquely aligned with the resources and capabilities.

Many countries have approached Govt. of India to invest and participate in development of Smart Cities in India, namely: China, Japan, France, Germany, Singapore, Spain and USA etc.

### **Progress**

The Govt. of India has identified a number of engineering consulting firms who would assist the various State Governments/UTs in preparation of proposals for submission to appointed authorities. Once the Cities are identified, the consultants would be engaged by respective state Governments/UTs to prepare proposals.

### **Case Discussion Questions:**

1. Does India’s leadership have a clear vision that is practical and doable within the allotted time frame? What problems do you foresee to accomplish goal?
2. Given the current ecosystem, is India ready to undertake this lofty challenge?
3. Does the PPP model work? What problems do you foresee? Where will the financing come from?
4. What would be the consequences if the vision cast by Modi fails and remains an unaccomplished dream?
5. List a few critical success factors that need to happen for India to succeed to accomplish this mission.

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<sup>15</sup> Smart City Maturity Model (SCMM), ISB, 2015, <http://www.isb.edu/research/white-papers/smart-city-maturity-model>