

Prototyping Scalable Smart Villages In Emerging Economies

UGBA 199 - 4 Units Project Course
Summer 2016 (July 5th – Aug 12th)

(Tentative Syllabus)

Professor: Solomon Darwin
Class Hours: Independent Group Project – 12 hours/week x 5 weeks of research = 60 hours
Office Hours: Flexible: One 30 minute weekly group meeting is required with the instructor in F402J
E-mail Address: darwin@haas.berkeley.edu
Prerequisite: Passion for the Project and willingness to work with a group – must be self-assertive
Corporate Advisors: IBM, Tyco, Cisco, Wipro, HCL, GE, SAP, Intel, Solar City, Google & Nestle
Textbooks: Recommended reading material are listed on page 9 – other readings (TBD)

Empowering Villages with Frugal Technologies and Open Business Models



Background for the Project:

The request to UC Berkeley for “Prototyping a Scalable Smart Village” came from the Chief Minister of Andhra Pradesh, one of the most progressive states in India. The Chief Minister was impressed with the work done by the Berkeley students in the fall 2015 Smart Cities class. Given that close to 70% of the population in India still live in Villages isolated from access to resources that cities enjoy, the Chief Minister launched a Smart Villages initiative to improve the quality of life, productivity and by providing access to state of the art technology – removing barriers for innovation, communication and community consensus. Take a look at his current dashboard that hangs in his office: <http://core.ap.gov.in/CMDashBoard/Index.aspx> His government has opened up its data to UC Berkeley given that we are a research organization - **Better Data = Better Decisions.**

“We also set up seven development missions, five campaigns and five grids – power, drinking water, gas, road connectivity and broadband connectivity. In this regard, we need to make every village Smart in which the community (individually and collectively), is empowered to make smart decisions using smart technologies with the support of smart manpower to be self-sufficient for their inclusive and sustainable development in 20 non-negotiable development commitments. We believe this would lead us to make the State of Andhra Pradesh Smart. We must also move in sync with the global transformation initiative. We sincerely believe that our objective cannot be achieved in totality without participation of people/community in the development process. Hence, I appeal to the people of Andhra Pradesh to proactively come forward for collective collaboration in the development process without waiting for someone from outside to come and help. I appeal to all individuals, partners, community members, institutions to optimally utilize all existing local resources; maximize available services, improve service chains, adopt appropriate technologies, create learning platforms, improve existing knowledge and skills (for collective actions to bring social change towards village self-sufficiency) and advance inclusive growth for the last mile.”

Chandrababu Naidu, Chief Minister of Andhra Pradesh

Here are few more facts to consider about potential opportunities India presents:

- By June, more Indians are expected to access the Internet on their cell phones – 371 million – than the entire population of the United States. That leaves nearly 1 billion Indians not yet connected.
- "India has become, besides the U.S., the biggest opportunity still out there", said Singh Dang, investment director at Intel Capital.
- Apple announced last month that it would open a 150-person office in Hyderabad. Last year, while iPhone sales were flat worldwide, they grew by 76 percent in India, prompting CEO Tim Cook to call the country an 'incredibly exiting' market.
- Why tech firms are betting big on India : <http://www.latimes.com/world/asia/la-fg-india-silicon-valley-20160228-story.html>

Objectives and Deliverables of the Project:

1. Evaluate the “Smart Village Program” rolled out by the Chief Minister (Program Summary is attached)
 - a. What are the critical success elements of the program?
 - b. What aspects are important to village communities that are NOT being address?
 - c. Is the program adapted to the social, political, and economic dynamic in the villages?
 - d. Identify the weakest links that need to be addressed to make the program a success

2. Evaluate the existing technologies being employed and explore alternative technologies that will lower the operating costs and offer new revenue opportunities for the village.
3. Evaluate traction for Public Private Partnership investment at a strategic level. Independent return on investment analysis to the stakeholders will be required.
4. Based on your research and analysis, recommend Innovative Business Models for the selected villages being prototyped.
5. Evaluate Apps or platforms that could be used by the villagers for e-governance to make faster decisions, curtail costs or enhances revenue streams for the entire ecosystem.
6. Provide an independent assessment about the effectiveness of the proposed plans, layout, architecture, design, infrastructure, technologies, resources, and talent necessary.
7. Suggest Open Innovation processes and platforms for soliciting external innovations that will help build a smart village.
8. Group Project: Your project, once it is complete, will be submitted to the Chief Minister's office for review and comment.

Purpose for the Course

The urban population in India is 67% rural vs. 33% urban while GDP Generation is just the reverse: 70% Urban and 30% rural. Empowering villages brings about a transformative change through technology will boost village economic GDP contribution by on-boarding village industry to global trade distribution networks, through internet of things (IOT), Communication and Cognitive Intelligence and Analytics Technologies.

Secondly, this course will result in giving ideas back to the companies UC Berkeley is collaborating with as well as provide foundation for future students that will work on similar projects.

Why Study the Models in India?

- Opportunity to Learn from a Major Market: India is like a real laboratory where we can learn without much investment. "We can already anticipate the problems . . . and attack them at the source. India has a fantastic opportunity where we can work outside of the shackles of existing technology," Rahul Sharma, IBM Executive.
- India is a Source of Frugal Innovations: Emerging economies are a great source of frugal innovations as they are birthed in a resource constrained environment surrounded by many frugal innovations (first seen or likely to be used first) in the developing world – eventually migrating to the industrialized world. The term "Reverse Innovation" refers broadly to the process whereby goods developed as inexpensive models to meet the needs of developing nations are then repackaged as low-cost innovative goods for Western nations.
- Comes with Commitment at the Top: Indian Prime Minister Modi and Chief Minister of Andhra State where the prototype is being developed made this a high priority to move the nations forward.
- India is the future:
 - Represents future growth - India is growing at 7% faster than China according World Bank
 - India's Strength: Innovation and Entrepreneurship

- Source of future talent: largest youth (10-24yrs.) population ~400M vs China 269M; US 65M
- Growing middle class: 50M to 200M by 2020 to 475M by 2030 – more than the US population

Future Scope:

UC Berkeley is collaborating with IBM, Nestle, Tyco, Cisco, SAP, Solar City, DuPont, HCL, Intel and Wipro to make this happen. We have several student researchers on the ground working on this project and collecting the needed data. This will enable us to suggest better models to the government. The students will need **to** work with people on the field to collect more data to complete this project.

The information and findings from this project will be utilized to develop the prototype that will be showcased in a selected village in the East Godavari District in Andhra Pradesh, India. The exact date is yet to be determined, but it will be sometime during last week of December or first week of January 2017. The prototype will need to be co-created with the local people to address their pain points that will address their needs, provide access to better and timely information to improve their lives. Communication to the CM's office will be done in "real time" via dashboards to transmit their needs, promising growth and access to more resources needed to develop 24/7 connectivity so that villagers voices and concerns are heard. Simple apps that farmers can develop to communicate via SMS, etc. Several professors at UC Berkeley and Stanford have joined hands to help in this effort.

Prototyping a Village as a Platform: The prototypes will be: a) Instrumented, b) Interconnected, and c) Intelligent (data capture/cognitive analytics) at price points that villages can afford. The purpose of the platform is to bring villagers into the managing process individually and collectively to enhance: a) community consensus, b) transparency, c) skill development, and d) entrepreneurial activities.

Items being considered for showcasing within the village:

- Smart House – being developed by a Stanford professor
- Smart Clinic
- Clean Water Systems
- Smart Sanitation
- Clean Energy
- Information Center – powered by cognitive computing
- Skill Development Center and Business Education
- Community Engagement Center for ideation
- Business Resource Center to further small scale industries using local resources
- Cultural Center to build brand identity for the village to foster tourism. Scalability of these villages is what will drive future revenue growth for MNEs like IBM, Nestle, etc.

Grading

Pass/Fail

Attachment:

Smart Village Program rolled out by the Chief Minister

Smart Village Program

Government of Andhra Pradesh

Summarized by Professor Darwin
UC Berkeley-Haas School of Business

The 20 Non-negotiables:

1. Homes for all – with access to toilet, safe-drinking water, and regular power
2. Every household has diversified livelihood opportunities and/or micro-enterprise
3. Access to skills development and Village Enterprise Development with bank and market linkages
4. End open defecation
5. Has functional solid/liquid waste management system
6. End all preventable maternal deaths and infant deaths
7. 100 percent institutional deliveries
8. Zero school drop outs of boys and girls up to 12th grade
9. Functional toilet, potable water, electricity available in schools, health centers, village buildings
10. Malnutrition free (children below 9 years of age)
11. No girl-child marriages (girls below 18 years of age)
12. Every farm has soil health card: essential micro-nutrients and diverse livestock & trees
13. Every village household has a functional bank account
14. Every village has its own dynamic development plan prepared by community participation
15. Every village has green trees all over its geographic boundaries
16. Every village has functional water conservation and harvesting structures
17. Every village has functional Information Centre, Computer Lab, and “your-service” Centre
18. Every village has telecom/internet connectivity
19. Village meetings to be held four times a year with minimum 2/3 attendance
20. Every village has a functional grievance redressal system

Approaches:

- a. Community engagement, participation and mobilization for local level development
- b. Converge government, private and voluntary initiatives with people’s aspirations and local potential to achieve comprehensive development.
- c. Leverage the leadership, capacity, commitment and energy of partners and volunteers
- d. Partner with voluntary organizations, co-operatives, academic and research institutions
- e. Attention to a life-cycle approach and gender sensitization
- f. Focus on outcomes and sustainability
- g. Protect local traditions and heritage of the village
- h. Self-reliant development through participative approaches of the villagers

Monitoring and Learning

The self-monitoring and learning system ensures that all the key stakeholders in the Smart Village Program, including sponsors and service providers, will capture and understand the following 5P elements of the program:

1. Progress – measured against work plans, key results, and inputs
2. Process – level of adherence to quality
3. Performance – achievement of outcomes and impact
4. Participation – level of participation of people, Partner(s), SHGs, other stakeholders
5. Persistence – level of coverage and sustainability of these benefits

Five SMART Metrics and indicators:

1. Specific – simple and relevant to the location, intervention, people
2. Measureable – easily measurable/observable by the community
3. Appropriate – to the local culture, program, resources
4. Reliable – valid information
5. Time-bound – timely for decision making and policy guidelines

Strategies:

1. Capacity Development and Empowerment at individual, group and institutional level to help ensure the demand, delivery, reach and use of quality services.
 - a. Identifying systemic bottlenecks and gaps
 - b. Improving data analysis and monitoring
 - c. Enhancing appropriate technical and entrepreneurial skills, and
 - d. Promoting social norms and behaviors favorable to village/community development
2. Social and Behavioral Change at community and individual levels:
 - a. Identifying, promoting and strengthening holistic development
 - b. Promoting behavior and practices favorable to realization of human rights
 - c. Empowering and enabling rights of disadvantaged - women and children
 - d. Bottom-up planning and Good Governance
 - e. Partnership and Collaborations

Expected Outcomes:

1. Collective responsibility to realize their shared vision of development
2. Incorporation of latest affordable technologies, and resources to facilitate and accelerate participatory, inclusive and sustainable development through partnerships.
3. Development of processes to strengthen on-going services and schemes for effectiveness and efficiency in equitable access and utilization of entitlements.
4. Significant improvements in the identified developments

Programs to Achieve the Objectives

The Seven Missions

1. **Rural Empowerment Mission:**
Making agriculture and allied activities profitable and sustainable for all around improvement of the rural economy.
2. **Social Empowerment Mission:**
Ensuring quality education, healthcare and nutrition for all citizens in order to achieve the millennium development goals and other global indicators.
3. **Knowledge and Skill Development Mission:**
Ensuring quality vocational education by providing students with skills that will make them employable and to further their education/research.
4. **Urban Development Mission:**
Establish three mega cities and 10 smart cities. Solid waste management and treatment of wastewater; and clean and green urban spaces are also key.
5. **Industry Sector Mission.**
Increasing the share of industrial sector for sustainable economic development - make the State attractive destination for national and global investment flows.
6. **Infrastructure Mission:**
Establish port-led development and road connectivity throughout the State. Provide quality power to agriculture, industry, domestic and commercial sectors.
7. **Service Sector Mission:**
Enhancing job opportunities through tourism, construction, hospitality, financial services, education, IT and other allied activities.

Five Grids:

The government has a vision of connecting each household to access to the basic amenities by establishing the following five grids in a definite timeframe.

1. **Water Grid** - to provide regular drinking water supply
2. **Road Grid** - to provide all-weather access to transport
3. **Power Grid** - to provide 24X7 uninterrupted quality power supply – 9 hours daily to farmers
4. **Gas Grid** - to provide access to gas
5. **Fiber Optic Grid** - to provide internet connectivity to each household

Five Campaigns:

To enhance awareness for soliciting participation of all stakeholders in the government initiatives

1. Call for Self Help:
 - to harness the strength of the Self Help Groups and to generate employment for quicker reduction of unemployment and poverty.
2. Call for Technology:
 - to integrate technology with agriculture to make it sustainable and more profitable to the farmers.
3. Call for Education:
 - to create awareness that elementary education is the right of every child
4. Call for Water:
 - to better manage water, following the ridge to valley approach for improving water-use efficiency of surface and ground water.
5. Call for Hygiene:
 - to keep the villages and cities clean. It includes cleaning of streets; clearing of drainage systems; waste management; keeping public institutions clean, etc.
 - to improve awareness on the individual habits of usage of toilets, hand-washing, safe handling and storage of drinking water.

My Village Programs:

To promote the wellbeing of the village

1. Pensions –compliant and enhanced pension distribution – Adhaar card
2. Health camps – primary health check-up and referral services
3. Veterinary camps – health check-up, vaccination and referral services
4. Sensitizing people through five campaigns
5. Sensitization on Primary sector, Social Empowerment, Knowledge/Skill Development and Urban Mission as part of micro planning for villages.
6. Preparation of Village Vision and Micro Plan to build village brand
7. Grievance Redressal - receiving and registering petitions, collecting department-wise data on Adhaar-linked profiles.

Result Based Management:

Result-based management framework, tools, timeframe and formats will be developed for each of the above, and shared with Partner(s) for reporting and participation, as appropriate. Awards and appreciation letters are proposed to be given in the following categories:

1. Best Smart Village
2. Best Facilitator(s)/ Partner(s)
3. Best Practices and Innovations
4. Best In-Charge Officers
5. Best District Collectors

Appendix

Recommended Reading Materials:

- Open Innovation: The New Imperative for Creating and Profiting from Technology
Author: Henry William Chesbrough

- Open Business Models: How to Thrive in the New Innovation Landscape
Author: Henry Chesbrough

- Service Innovation Triangle: the building blocks for innovation
<http://www.bi.edu/PageFiles/214077/Service%20Innovation%20Triangle%20Booklet.pdf?epslanguage=en>
Author: Dr Peder Inge Furseth & Dr Richard Cuthbertson, Norwegian Business School

- Alexander Osterwalder's Materials on the Business Model Canvas

Value Proposition Canvas (explained) - SlideShare
www.slideshare.net/juliusparrisius/value-proposition-canvas-explained
This deck explains what the Value Proposition Canvas

Mapping Customer Pains to Value
<https://www.youtube.com/watch?v=xTtwAmjais>

Value Proposition Design - SlideShare
www.slideshare.net/ypigneur/value-proposition-design-47698911

- A look at Use Cases – No Return on Investment in Village adoption
A look at “Akodara” village in Sabarkantha District – Gujarat. This village was adopted by ICICI bank and is India's first digital village.
<http://www.businesstoday.in/sectors/banks/icici-launches-digital-village-project-adopts-gujarat-village/story/214196.html>

<http://www.thehindu.com/opinion/op-ed/at-akodara-indias-first-digital-village/article7418012.ece>

<http://computer.financialexpress.com/features/egovwatch-rural-village-gets-a-digital-makeover/8593/>

Some Survey Results -2015/2016

Pain Point Survey Conducted

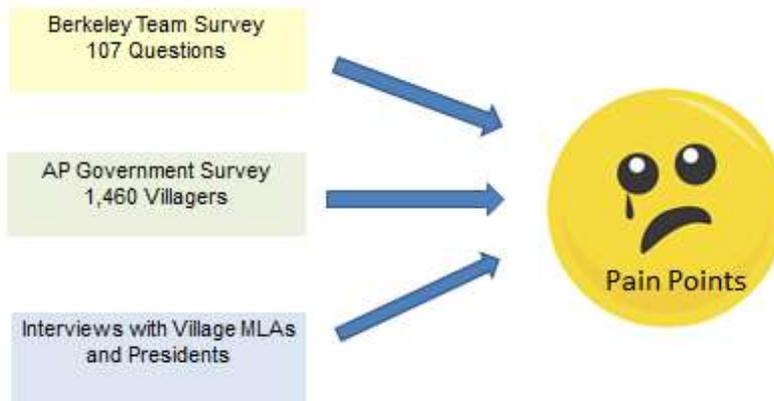
Berkeley Survey

1. Housing
2. Sanitation
3. Telecommunications
4. Transportation
5. Energy
6. Food & Water
7. Education
8. Health & Safety
9. Community Data
10. Financial Inclusion
11. Economic Drivers
12. Cultural Identity

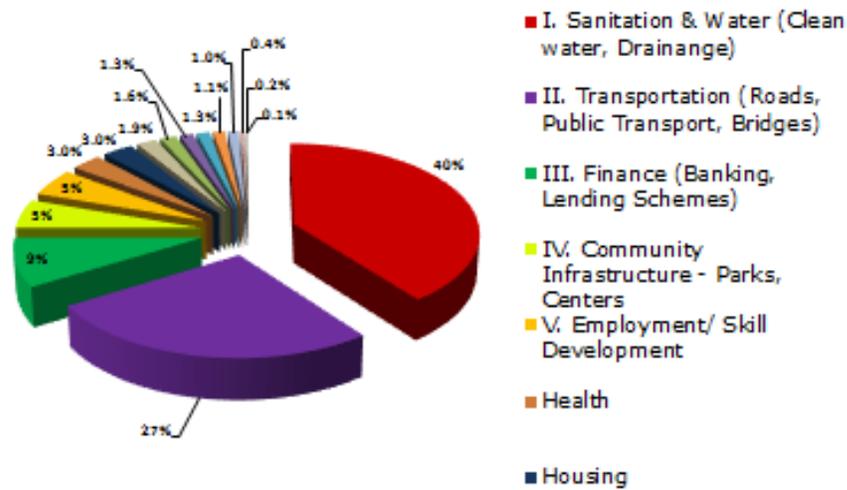
AP Government Survey

1. Quality of Services from Govt
2. Agriculture support
3. Waste management
4. Health services
5. Sanitation and Water
6. Financial Inclusion
7. Welfare Programs
8. Housing
9. Transportation
10. Skill Development
11. Vision (Outlook)

Methodology for Identifying the Pain Points



Pain Point Survey Results



Pain Points

Based on Personal Interviews with 50 Villagers

1. Lack of Access to Information
 - About programs, schemes related to individual development
2. Corruption
 - Major obstacle
3. Limited Economic drivers
 - Agriculture & Cottage industries
4. Emigration to Cities
 - Major drivers: Education & Employment
5. Education
 - Lack of Access