

Program in Business Innovation & Analytics Self-Directed Project-Based Course

Fall 2021

Lead Instructors:

Solomon Darwin (Executive Director, Ctr for Growth Markets & Garwood Ctr for Corporate Innovation, Haas)
Gauthier Vasseur (Executive Director, Fisher Center for Business Analytics, Haas)

Teaching Faculty:

Dr. Arding Hsu (Ret. CEO & President of Siemens Technologies)
Dr. Murali Krishna (Ret Director of JNTU)
Dr. Anil Shah (Cardiologist, Business Entrepreneur and Chairman of the Smart Village Movement)

Corporate Mentors:

Dr. Deepu Rathi (Sr. Director, Cisco)
Dr. Bandyopadhyay Gautam (Innovation Director, Siemens)
Mr. Robert Locke (SVP, Johnson Controls)
Mr. Uday Kapoor (Engineer, IIT Delhi; Documenter, Computer History Museum, Silicon Valley)
Mr. Raymond Liao (Managing Director, Samsung)
Mr. Timo Wadhawan (CFO, Heartwood 3D)

Learning Objective:

Create business model solutions to address the pain-points of rural people in India with support from Smart Village Movement teams and participating firms. Understand the basics of data and analytics to be able to understand and implement digital transformation projects as part of these proposed solutions.

Project Description:

Develop a launch-ready business model solution for already-identified challenges in one of eight verticals: 1) Education, 2) Agriculture, 3) Healthcare (includes Water & Sanitation), 4) Information & Communication Technology, 5) Energy, 6) Entrepreneurship (Livelihood/Small Business), 7) Safety and Security, and 8) Transportation. Solutions are developed through researching and understanding on-ground realities and challenges in villages. Proposed business models should be scalable based on an ecosystem approach that benefits all stakeholders within the business ecosystem.

Purpose-driven Project:

There are 650,000 villages in India where 70% of its 1.3 billion people live.. This represents one of the world's largest untapped markets and offers scale and an immense opportunity for firms to build sustainable business models. Unlike the urban markets, the rural markets are unsaturated and offer first-mover advantage to those firms willing to explore and experiment with disruptive business models.

No strategy or model will work in rural areas unless it is rooted in genuine care for the people to address their pain points. Projects should empower people at the bottom of the pyramid to access global markets through digital technologies and open innovation platforms for socioeconomic development in rural areas. This approach will promote a sustainable customer base for firms to expand markets through low-margin, high-volume strategies. Villages offer both scale and scope to firms for sustainable economic development.

The goal is to develop business model solutions that address villagers' pain points through interaction with the five resource groups listed below. **The business model solutions need to be: a) accessible, affordable, frictionless, transparent, and adaptable; b) scalable and sustainable to all villages within a state. Each student will choose one project/ challenge and develop a business model that is scalable and sustainable models for rural India.**

Students will have access to and can pick projects from innovation platforms. Completing a project is required to pass the course. Students are expected to work individually but can form their own support ecosystem of advisers and experts to help them. The students are expected to show an aspirational, entrepreneurial mindset, be self-starters, and draw knowledge and information from various sources on their own.

Digital and Business Analytics Empowerment:

As a foundational skill set, students will be trained to work with data and digital technologies. This business analytics literacy will enable them to improve their business models, assess opportunities, and track their activities accurately and sustainably. It will also empower them to work with more visibility and agility. Finally, this competency will improve their ability to collect and leverage the data available to them while researching their projects.

Platforms:

Students will be introduced to the following sources for project ideas:

- NASA's unused IP is available for researching potential commercial applications and business solutions.
- Smart Village Movement Platform - students can choose from challenges posted on the open innovation platform. Project categories fall into eight vertices: 1) Education, 2) Agriculture, 3) Healthcare (includes Water & Sanitation), 4) Information & Communication Technology, 5) Energy, 6) Entrepreneurship (Livelihood/Small Business), 7) Safety and Security, and 8) Transportation.
- Plug & Play start-up base - students can research applications from 10,000 startups and 280 corporate partners for potential commercial applications in rural India.
- Berkeley Skydeck - Another source for potential project ideas to research commercial applications in the context of a smart village from 400 active startups.

Strategy Employed for Pilot Projects: Specific village clusters have been selected where technology solutions are being piloted in the states of Meghalaya, Andhra, and Gujarat. In the State of Meghalaya, two clusters were selected consisting of 100 villages. Each cluster is divided into two more clusters, one selected for treatment and the other for control, where no technology will be employed. The two clusters will be insulated by distance to reduce contamination but will be similar to one another to allow comparison to study the impact of the smart village creation. The selected villages have enough critical mass for experimentation to develop scalable and sustainable models. The pilot sites are used as 'Innovation Labs' to test multiple ideas and perform several iterations of selected business models, with an objective to arrive at an acceptable solution that will benefit all stakeholders.

Five Resource Providers for Students to Develop Innovative Solutions:

1. **Smart Village Movement (SVM) Platform:** The SVM platform contains a library of challenges for students to select and undertake projects based on their passions. The SVM Open Innovation Platform was conceived and designed at the Garwood Center for Corporate Innovation by Solomon Darwin to enable students to formulate and accelerate solutions to rural problems in Indian villages. The platform offers five Open Innovation resources for students: 1) Technology stack (list of emerging technology solutions that have been researched and put on the platform by the open innovation community; 2) Tools to develop business models for these emerging (half-baked and fully baked) technologies; 3) Collaborative forums to engage with other ecosystem stakeholders to develop their innovative ideas; 4) Repository of data and knowledge that is being continually updated to build better models; 5) Past projects, presentations, and surveys that will provide good examples from which students can learn and improve their business models without reinventing the wheel.

The SVM Platform engages all stakeholders in one place to accelerate solutions. This facilitates timely collaboration, data collection, and knowledge sharing, and eliminates the need for emails and telephone calls that take up time. All requests are made and submitted via the SVM platform to accumulate information, data, use cases, research, surveys, opportunities, failure cases, success cases, and available technologies for all to use across verticals. This facilitates resource and knowledge sharing and saves time by eliminating redundancy and duplication. We will train and equip students to use this tool effectively to optimize the project outcomes. We'll also assist students with designing surveys, data sourcing, and analysis to help formulate and pivot business models on the ground.

2. **Books and SVM Manual:** Solomon Darwin published a manual called “Creating Smart Villages” based on actual on-the-ground experiences in India. The 2nd book, called “Smart Villages of Tomorrow – The Road to Mori,” is another resource for students. This book describes the first smart village prototype developed in collaboration with Silicon Valley firms in the Mori Village. The book explores the successes and failures of various business models attempted during this experiment with the government of India in the state of Andhra Pradesh. Darwin has published several Harvard cases on Smart Villages, as well as a white paper on Smart Village Ecosystems for Bill Gates during his visit to India’s Ag Tech Conference in 2017. All these resources are available on the platform and on Amazon.
3. **Student Self-formed Support Group:** The SVM platform is a workplace for enrolled students to engage with other students, but assignments need to be turned in individually. However, each enrolled student is expected to recruit their own support group outside of the enrolled cohort during the course term. The support group and mentors should be diverse and may include family members, friends, and experts willing to help them with this project – this is how open innovation happens – good ideas come from unanticipated sources.
4. **On-the-Ground Smart Village Team:** This team is Berkeley-trained in business models, open innovation, and lean start-up approaches to conduct pilots. This SVM team is another resource for students to access as they research and work on their projects. The SVM teams work directly with the Office of the Chief Minister in states where pilots are being performed. The team interfaces with government officials that include Principal Secretaries related to each of the eight verticals.
5. **Participating Corporate Executives:** Students can work with various firms that are piloting the business models on the ground to assist them in designing surveys and collecting relevant data for analysis and feedback. The full list of some sixty firms engaging in the pilot projects is attached.

Instruction and Method of Working:

Instruction will take place in the class by the teaching faculty as shown on the schedule below. By the end of the two-week instruction period, students are expected to finalize their projects. The following weeks students will work independently and may take advantage of weekly mentor office hours.

All students are required to sign up on the SVM Open Innovation Platform. The stakeholders on the platform include: villagers in pilot villages, key government officials, academics, corporate executives, startups and students from local and international universities. The platform will be utilized to capture data and information as it is generated for analysis and developing models. The platform is intended to foster collaborative innovation by engaging all stakeholders across industries. This approach focuses on solving challenges by delivering models for cost-effective speed-to-market solutions. Students will be encouraged to study both the supply chains and value chains in recommending total product/service solutions (supply chains involve all parties in fulfilling a customer request and leading to customer satisfaction, while a value chain is a set of interrelated activities a company uses to create a competitive advantage). Ecosystems result in a) cost elimination, b) risk-sharing, c) knowledge flow and exchange, d) time savings and e) speed to market for farmers and village merchants.

The students are expected to formulate and recommend an ecosystem for their proposed business model. Efficient ecosystems are formed when firms come together to help the end customer prosper in the long-term to grow his or her business. An ecosystem is like the human body, consisting of many essential parts that work together in full cooperation and coordination to deliver value to its most distant extremities in a timely and efficient way.

Final Presentation (paper) and Deliverables:

Develop a launch-ready solution to a specific village challenge posted on the SVM Platform in any one of the eight verticals approved by the course instructor: 1) Education, 2) Agriculture, 3) Healthcare (includes Water & Sanitation), 4) Information & Communication Technology, 5) Energy, 6) Entrepreneurship (Livelihood/Small Business), 7) Safety and Security, and 8) Transportation. The solutions should be based on technologies delivered through open business models, platforms and ecosystems.

- a. Evaluate both failure and successful use cases to affirm the model that is being piloted and make suggestions.
- b. Recommend alternative solutions (technologies and business models) that could be a better fit to address the villagers' pain-points based on your research.
- c. Assess the models being piloted to analyze how you could test its scalability and sustainability based on data and information you have collected.
- d. Suggest improvements to the current pilot process through feedback and data collected from the ground team.
- e. Quantify the socioeconomic impact if your suggested model is employed in all villages in the state.

Instruction Schedule - between 7am – 10am PDT (7:30-10:30 pm IST)

Topics and Instructors/Speakers:

August 2	Open Innovation	Solomon Darwin	7:00 - 10:00 AM
August 3	Business Model Innovation Business Model Formulation	Solomon Darwin	7:00 - 10:00 AM
August 4	Open Business Models and Ecosystems	Solomon Darwin	7:00 - 10:00 AM
August 5	Know the Technology useful for your projects	Gauthier Vasseur	7:00 - 10:00 AM
August 6	Fluidify your Data to control your projects	Gauthier Vasseur	7:00 - 10:00 AM
August 9	Get the Real Big Data Value	Gauthier Vasseur	7:00 - 10:00 AM
August 10	Leadership and Change	Gauthier Vasseur	7:00 - 10:00 AM
August 11	Process Efficiency and Sustainability	Gauthier Vasseur	7:00 - 10:00 AM
August 12	Creating and Exploring New Markets/Products Lean Launchpad Model Theory Lean Launchpad Implementation Strategies Pivoting Strategies and Methodologies	Dr Arding Hsu Deepu Rathi Dr. Bandyopadhyay Gautam	7:00 - 10:00 AM
August 13	Survey and Development Project Execution and Ground Realities Working with Smart Villages Movement	Solomon Darwin Dr. Murali Krishna Dr. Anil Shah	7:00 - 10:00 AM
August 14 - October 29	Project work	Independent with online office hours available to answer questions.	

Required Readings:

- Creating Smart Villages – download from Amazon.
- Rebuilding India - Resetting the Jewel in the Crown -- download from Amazon.

Although the focus of this course is on Indian villages, the use cases developed through this independent study is applicable to other expanding emerging economies.

Class Meetings:

Weekly Zoom meetings with Solomon Darwin and mentors (as needed) on Friday mornings 8am-9am PDT (8:30-9:30 pm IST) to provide an update and feedback until the end of the course. The SVM team will upload available information on the Smart Village Platform for easy access and feedback. The students from here onwards will work independently as self-starters and make their own connections. Dr. Murali will conduct weekly discussion sessions to help students with the application of theory to practical application on ground. Mentors and fellows associated with each vertical will hold weekly officer hours to help students think through their models and solutions.

Grading Criteria: Pass/Fail - Based on feedback provided by the SVM fellows on the deliverables submitted

Class Start Date: August 2, 2021

Final Project Submission Date: October 29, 2021

SVM OIP Address: www.smartvillagemovement.org

Inquiries for OIP: info@smartvillagemovement.org

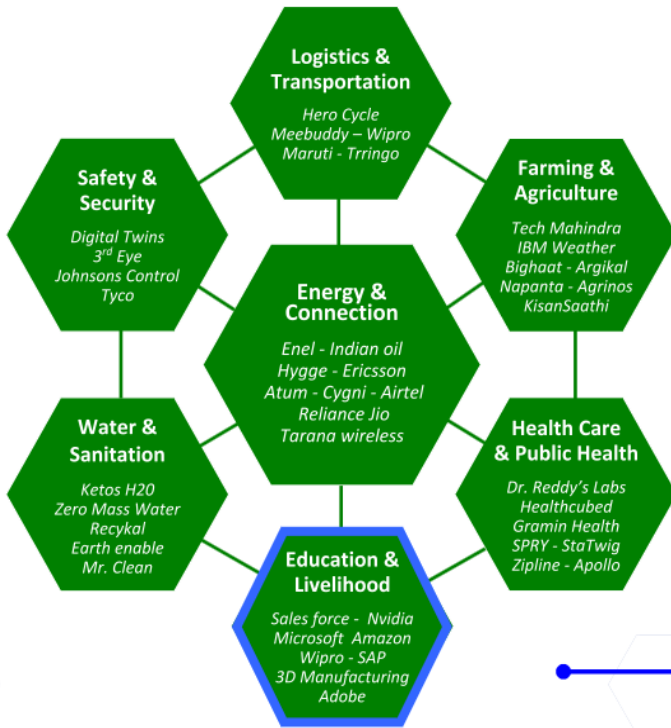
Program/Participant Support: innovationandanalytics@berkeley.edu

Correspondence: All communication must happen on the SVM platform for proper tracking of the project progress (No telephone calls – It will be all digital)

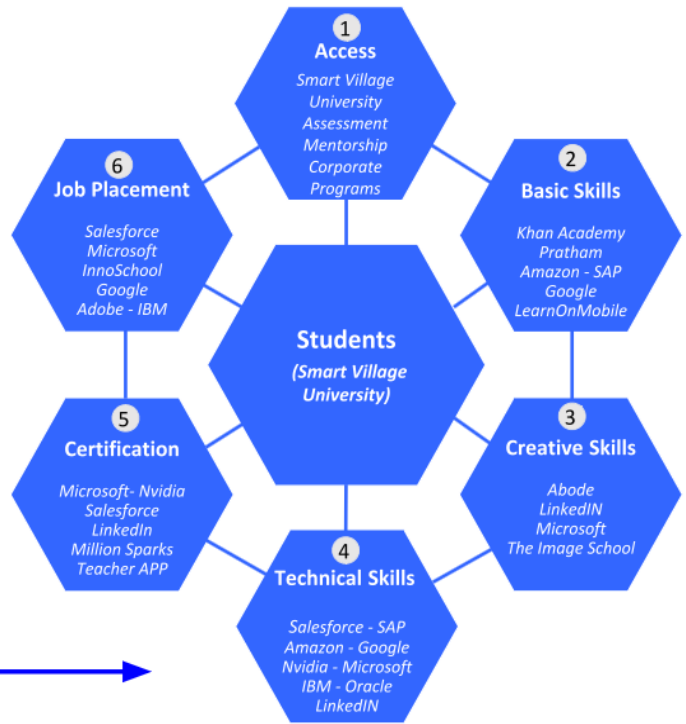
Interested and Potential Firms

Education/ Livelihood	Agriculture	Healthcare/ Sanitation	Energy	ICT	Rural Transport	Safety/ Security
1. Salesforce	18. Agrikal	37. Apollo Hosp.	59. Enel	64. Airtel	68. Hero Cycles	73. 3rd Eye
2. SAP	19. Agrinos	38. Cosine Labs	60. Indian Oil	65. Reliance	69. Maruti	74. Digital Twins
3. Adobe	20. Agri Yoda	39. Curofy	61. Atum	66. Ericsson	70. MeeBuddy	75. Johnson Controls
4. Amazon	21. BigHaat	40. Reddy Labs	62. Cygni	67. Tarana	71. Trringo	76. Tyco
5. Google	22. eFresh Global	41. EarthEnable	Energy	Wireless	72. Wipro	
6. IBM	23. Fascrop	42. GOQii	63. Hygge			
7. Khan Academy	24. ftcash	43. Gramin				
8. LearnOnMobile	25. IBM Weather	44. HealthCube				
9. LinkedIn	26. Janani Foods	45. Ketos				
10. Microsoft	27. Kisan Saathi	46. Mr. Clean				
11. NVIDIA	28. Kratos	47. NetMeds				
12. Oracle	29. NaPanta	48. Portea				
13. Pratham	30. Natural Capital	49. Practo				
14. 3D Manufacture	31. Ninjacart	50. Recykal				
15. The image school	32. Plantix	51. RedwingLab				
16. Inno school	33. Syngenta Found.	52. Spry Health				
17. Teacher app	34. Tech Mahindra	53. StaTwig				
	35. Waycool	54. WEconnect				
	36. Wipro	55. YourDOST				
		56. Zero Mass				
		57. 1MG				
		58. A3 RMT				

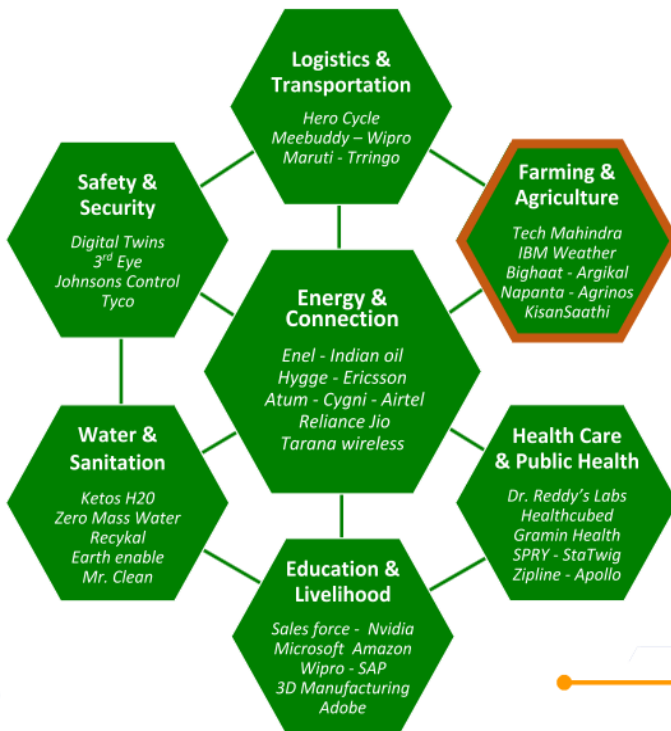
SVM: Participating Companies



Education Ecosystem: From access to Job Placement



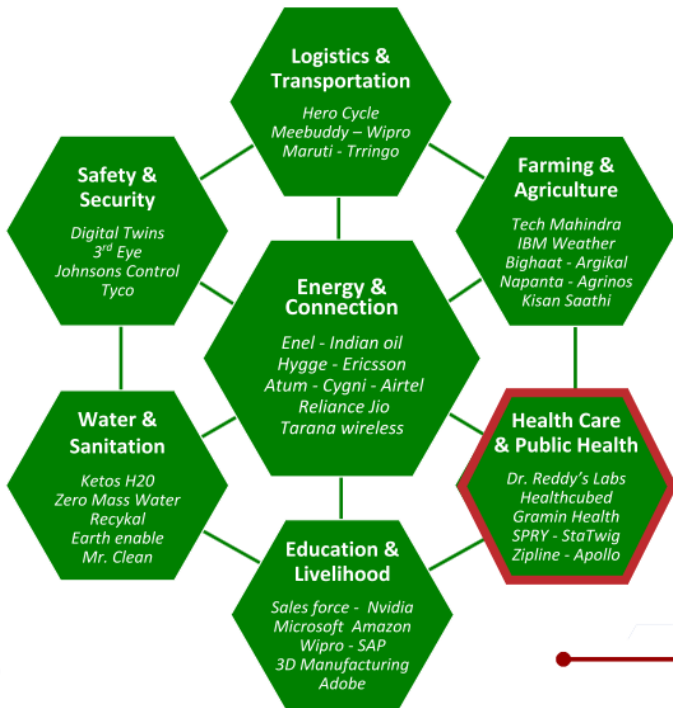
SVM: Participating Companies



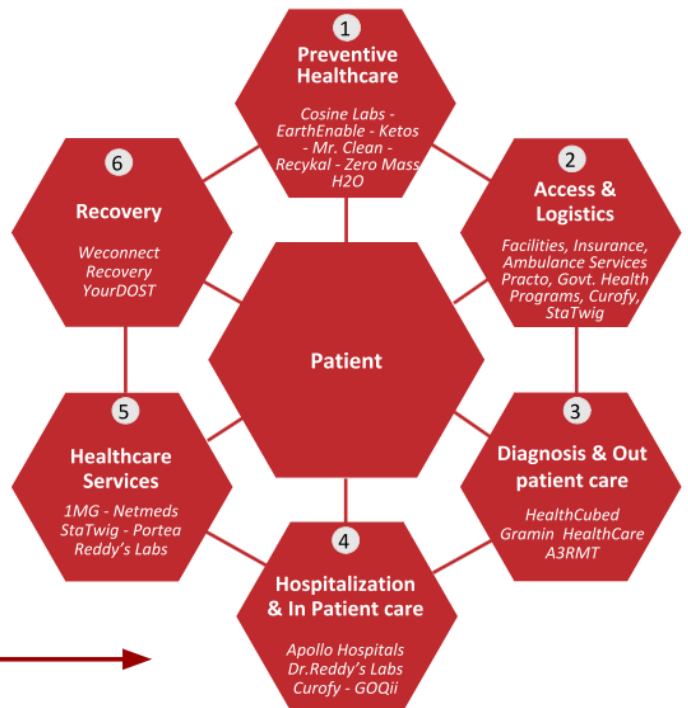
Agriculture Ecosystem: From market access to Inputs



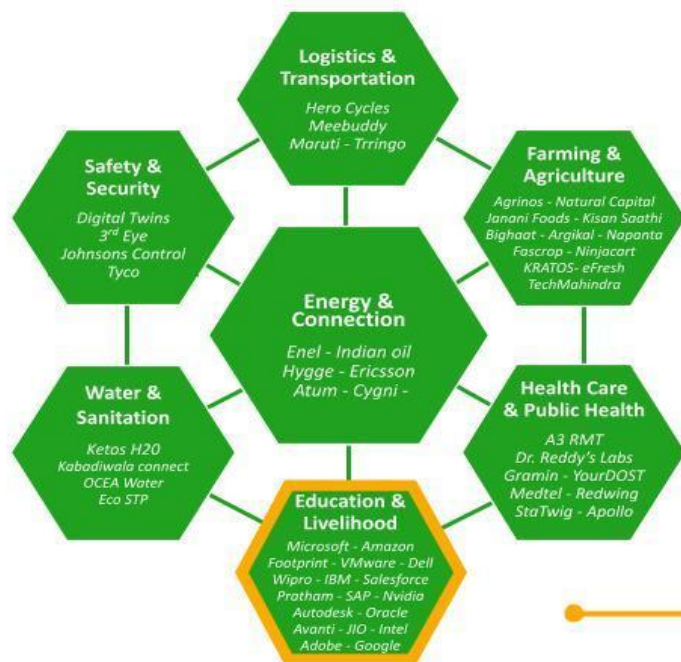
SVM: Participating Companies



Public Health Ecosystem: From Access to Recovery



SVM Ecosystem: Participating Companies



Entrepreneurship Ecosystem : Launch to Profitability



Background:

There has been a great deal of work in recent years that explores the design, development, and deployment of Smart Cities. This enables cities to be livable, offer new services to residents, and make better use of resources. However, people living in villages (at the bottom of the pyramid) are neglected – they suffer from having little or no access to resources, information, tools, and services - they have yet to be empowered with digital technologies to better their lives.

Multinationals often serve the rich to generate better margins for themselves. It is an open question of whether and how simple and cost-effective digital technologies could create opportunities for multinationals worldwide to serve the neglected majority. New Scalable Open Business Models are required for business enterprises to generate profits while creating value for people living at the bottom of the pyramid.

The Garwood Center for Corporate Innovation at UC Berkeley developed a process to prototype a Smart Village in collaboration with the Government of India. More than 26 technology firms from around the world participated in prototyping a smart scalable village to serve as a model for the rest of the 650,000 villages in India. Please register on <http://platform.smartvillagemovement.org/> and explore www.smartvillagemovement.org for a full list of partners and SVM platform information.

A village called “Mori” was prototyped. A co-innovation area was set-up for villagers to engage with technology firms, such as Google, IBM, Qualcomm, Ericsson, Cisco, Microsoft, Tyco, and others. Open innovation methods and strategies employed to connect the villagers with technology firms. The work in Mori Village Phase 1 was completed on December 30th, 2016. Phase 2 was completed on July 1, 2018. Learnings from the prototyping experiments have been published in Solomon Darwin's book: *Smart Villages of Tomorrow – The Road to Mori*. The story behind the Smart Village Movement is published in Solomon Darwin's 2nd book *The Untouchables – Stories of Entrepreneurship, Education & Equal Opportunity* – available on Amazon.

Other Resources:

- Creating Smart Villages – download from Amazon
- Rebuilding India - Resetting the Jewel in the Crown
- Smart Villages of Tomorrow – The Road to Mori – The First Smart Village Prototyped in India – on Amazon
- Smart Villages: Harvard Case (A)
- Smart Villages: Harvard Case (B)
- White Paper on Smart Ecosystems – prepared for Mr. Bill Gates
- Smart Village Manual – by Solomon Darwin and his research team in India

Although the focus of this course is on Indian villages, the use cases developed through this independent study is applicable to other expanding emerging economies.

Program in Business Innovation & Analytics Self-Directed Project-Based Course

Starting Date: August 2, 2021

Lean Startup (LaunchPad) Methodology Section

Number of Students: ~ 200

Students will be divided into groups with ~15 in each group. Each group has a designated mentor and a teacher assistant. A teacher assistant (TA) will be selected (ask for volunteer) from the student group. The incentive to a TA is personalized mentoring from the mentor.

Instructor/Advisor:

Dr. Arding Hsu

Dr. Deepu Rathi

Dr. Gautam (Gus) Bandyopadhyay

Mentors: will have >10 mentors

Dr. Arding Hsu

Dr. Deepu Rathi

Dr. Gautam (Gus) Bandyopadhyay

Mr. Robert Locke

Mr. Uday Kapoor

Dr. Raymond Liao

Dr. Timo Wadhawan

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Goal: The goal is to have students to learn the basics of Lean Startup methodology and then use it to complete the creation and validation of their business models thru interviewing stakeholders (companies, farmers, partners, government officials, etc.).

Deliverable: An evidence-based repeatable and scalable business model briefed in Business Model Canvas with detailed in PPT.

What students should learn?

1. A world famous and widely adopted business model creation and validation methodology which will benefits your future study and career.
2. Be an entrepreneur to pro-actively use available resources to achieve the goal. This is a self-driven course. If a student is not self-motivated and pro-active, she/he should not attend.

Request for Student at Registration:

At the registration, a student should bring in a **candidate solution** (project) which addresses a listed **challenge** under a **vertical**. This is selected from one of the following:

1. SVM participating companies
2. NASA Ames
3. Plug and Play
4. Skydeck
5. Berkeley Innovation Forum companies

Each of the above organizations will provide a list of candidate projects for student selection.

A student will submit the following for registration:

1. What for What statement
2. A short text on usage scenario of selected solution

Students should do this quickly. Please keep in mind that they are hypotheses and will be validated and changed during the practice of Lean Startup methodology.

Students must do before the class

Students will read the provided material and watch required videos as follows. Then, they will have one session with instructor/advisor for selected team presenting on what they have learned. After that, we will continue the learning by doing.

Learn Lean Startup Basics

1. Read the HBR article by Steve Blank.
<https://hbr.org/2013/05/why-the-lean-start-up-changes-everything>
2. Watch the free Udacity course videos by Steve Blank. Attached is the link:
<https://www.udacity.com/course/how-to-build-a-startup--ep245>. **The total time is about 5 hours.**

After watching the videos, each student will produce 3 slides for each block of the business model canvas as follows:

- learned major to dos and not to dos
- must have contents (from videos + own thought)
- questions to be asked for validation (from videos + own thought)

Attached please find an example.

On week 2, we will randomly select a few students to present their learning slides to instructor/advisor for feedback. We want to make sure all the students have watched the videos with good understanding.

Learning on Competitor Analysis and Business Ecosystem Analysis

In the Lean business model canvas, the competition part is not included. We suggest the students to self-study the following three things:

1. Petal diagram to identify competitors (including potential). Please read the article from Steve Blank.
<https://steveblank.com/2013/11/08/a-new-way-to-look-at-competitors/>
A lot of good materials there.
2. Value chart to do comparison. Please watch the following video.
https://www.youtube.com/watch?v=Upt_28d-WGg
3. VRIO diagram to validate if the competitive advantages are sustainable. Please watch the following video.
<https://www.youtube.com/watch?v=RMIbCpcpSt8>

Initial Course on Lean Startup

	Student Work	TA Work	Instructor/Advisor
Week 2: Course on Lean Startup	Have your learning slides ready for presentation	Arrange (somehow randomly) 8 presentations with WfW, Usage Scenario, and Customer Segments learning from video	<ul style="list-style-type: none"> • (1 hr) Deepu moderates and gives feedback to 3 presentations • (1 hr) Gus moderates and gives feedback to 3 presentations • (40 mins) Arding moderates and gives feedback to 2 presentations • (20 mins) Arding talks about customer discovery

Week by Week Student Work and Final on Lean Startup

Hope we will have enough mentors, and each mentor will have around 15 students. In this way, each student will have a presentation opportunity.

	Student Work	TA Work	Interaction with Mentor (90 mins)
Week 3: Value Proposition	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 4: Customer Segments	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 5: Revisit Product/Market Fit	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 6: Revenue Streams	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 7: Distribution Channels	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 8: Customer Relationships	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 9: Activities & Resources	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Following week example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A
Week 10: Partners & Cost	Work on the topic and prepare the PPT summary to be ready for presentation on Monday	<ul style="list-style-type: none"> • Arrange 2 for the presentation • Final presentation example prepared 	<ul style="list-style-type: none"> • 2 presentations (20 mins) + 10 mins mentor feedback • 30 mins students Q&A

Week 11: Final Review 1	Final PPT with lessons learned	Arrange final presentation	8 mins for each + 2 mins feedback
Week 12: Final Review 2	Final PPT with lessons learned	Arrange final presentation	8 mins for each + 2 mins feedback