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Leveraging Information and Communication Technologies for Sustainable Development in Rural India

A Case Study on India's Rural Technology and Business Incubator (RTBI)

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A rural health clinic which practices Traditional Medicine in the village of Keelasevalpatti, Tamil Nadu, India.

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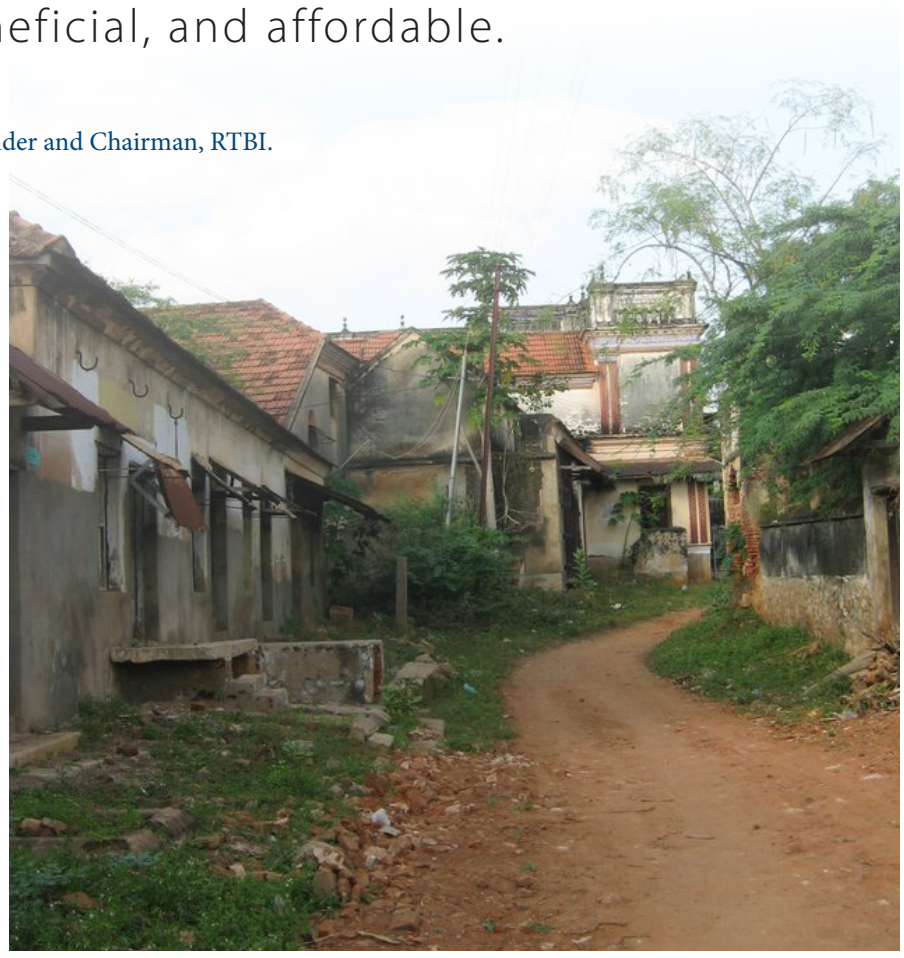
But that is the wrong conclusion. We have to understand the minds of the villagers, their local contexts, and why they behave the way they do. We cannot assume that they are responding in a certain way because they are unable or unwilling to accept technology, or because they don't want better healthcare. In fact, it is quite rare that they refuse anything that is safe, beneficial, and affordable.

– Dr. Ashok Jhunjhunwala, Founder and Chairman, RTBI.



Information technology can reach villages far from major cities including the Sirukoodalpatti Village in Tamil Nadu, India.

Introduction

While development theory offers a variety of approaches for achieving societal change, challenges inevitably arise in the translation to real-world situations. Likewise, business incubation often requires entrepreneurs to adjust their vision in order to adapt ideas and innovations to the realities of their marketplaces and customers. From both the development and business incubation perspectives, mentorship, local knowledge, and partnerships are critical to success.

This case study explores the model and approach of one organization in India, the Rural Technology and Business Incubator (RTBI), and provides a brief analysis of key lessons learned over the past few years:

1. Rural areas require innovations that take into account local contexts and needs
2. Entrepreneurship is key to sustainable development
3. Diversity of input is critical to innovation
4. IT is the tool, not the goal

RTBI is an independent, university-based, non-profit institution funded primarily by grants and donations. Its goal is to combine entrepreneurship with social development in rural India, with information technology as the primary development tool.

Business incubators are plentiful, and in fact many of them focus on the use of information and communication technologies, and many are based in universities. The aim of this paper is neither to propose a set of finite rules for creating a successful business incubator in India nor to dissect the day-to-day operations of RTBI, but rather to introduce one of many organizations working to facilitate innovation in rural settings and use its recent experience and conceptual foundation as a lens. The challenges and lessons described in this document are meant to catalyze discussion about innovative ways to approach social development.

While this case study explores RTBI's work in India, these lessons can be applied to broader types of development work—especially global health work—in rural areas worldwide. The lessons are not new; the global health community continues to re-learn these lessons again and again every year, with every generation.

RTBI Genesis and Approach

RTBI was created in October of 2006 with support from the Government of India's Department of Science and Technology and InfoDev (an arm of the World Bank). It emerged from IIT (Indian Institute of Technology) Chennai's informal incubator, the TeNet (Telecommunications and Networking) Group, which has been at the frontline of technology innovations in the developing world for the past 20 years. With a leadership comprised of faculty members from the Department of Electrical Engineering and the Department of Computer Science at IIT Chennai, The TeNet Group not only originally conceived RTBI, but it has also continued to be closely involved in the new incubator's idea generation, technology development and prototyping, business model design, and even pilot selection and mentorship.

The impetus for RTBI arose from a recognition that the large population of India's rural poor are not engaged in—nor do they benefit from—India's technology revolution and economic growth. While this

The Health of a Nation: India's Rural-Urban Gap

Rural India makes up almost 70 percent of India's population and holds 60 percent of the workforce. The gap between rural and urban, and rich and poor, is increasing, as evidenced by the stark differences in the health status and access to health services for populations in both areas.

Agriculture remains the primary economic driver in rural India and constitutes 60 percent of the workforce of the whole country, yet it only contributes to 20 percent of GDP. While urban India houses only a small percentage of the overall workforce, it is still the major driver of the economy, and therefore, controls and benefits first from new opportunities and improvements in technology, lifestyle, and healthcare.

Egattur Village, Thiruvallur District.

The focus of health policy in India has shifted from comprehensive, universal healthcare to targeted program-based healthcare, with the public domain confined to family planning, immunization, selected disease surveillance, and medical education and research. Larger outpatient care has become almost exclusively a private health sector monopoly, and the hospital sector is increasingly surrendering to the market. The decline of public investments and expenditures in the health sector since 1992 has further weakened the public health sector, adversely affecting poor and other vulnerable sections of society. Out-of-pocket expenditures account for 80 percent of India's spending on healthcare. Regrettably, healthcare costs and health-related debt are skyrocketing, which in turn drives millions of people further into poverty each year.

This socio-economic imbalance between rural and urban India demands immediate attention. Capital flows, population shifts, and foreign trade are a few factors that play a prominent role in controlling economies in both rural and urban areas. How effectively we manage these factors remains an unanswered question.

population is considered by some to be entrenched in a cycle of poverty and helplessness, professors at IIT Chennai, spearheaded by Dr. Ashok Jhunjhunwala (RTBI's Chairman), appreciate this population's desire for social change, as well as the large potential market it represents. RTBI was thus created to help empower rural populations with the infrastructure, funding, and mentorship necessary to create sustainable businesses with a social, as well as financial, benefit to the communities in which they operate.

While its founders recognize that an exclusive focus on technology will not solve the problems of rural India alone, RTBI operates on the premise that the socio-economic needs of rural Indians can be addressed through a tangible, market-driven, and adaptive technological approach tailored to local community circumstances and based in the villages themselves. All of RTBI's objectives are aligned with serving unique rural contexts.

To date, RTBI has successfully incubated four ventures (DesiCrew, ROPE, Intelizon, and Uniphore) and continues work in seven districts in the state of Tamil Nadu, each of which serves as a different piloting

region. Success means that these ventures' prototypes have proved viable through several phases of testing and research in the field. RTBI and the TeNet Group then facilitate the scaling-up process and introduce the ventures more widely into the market.

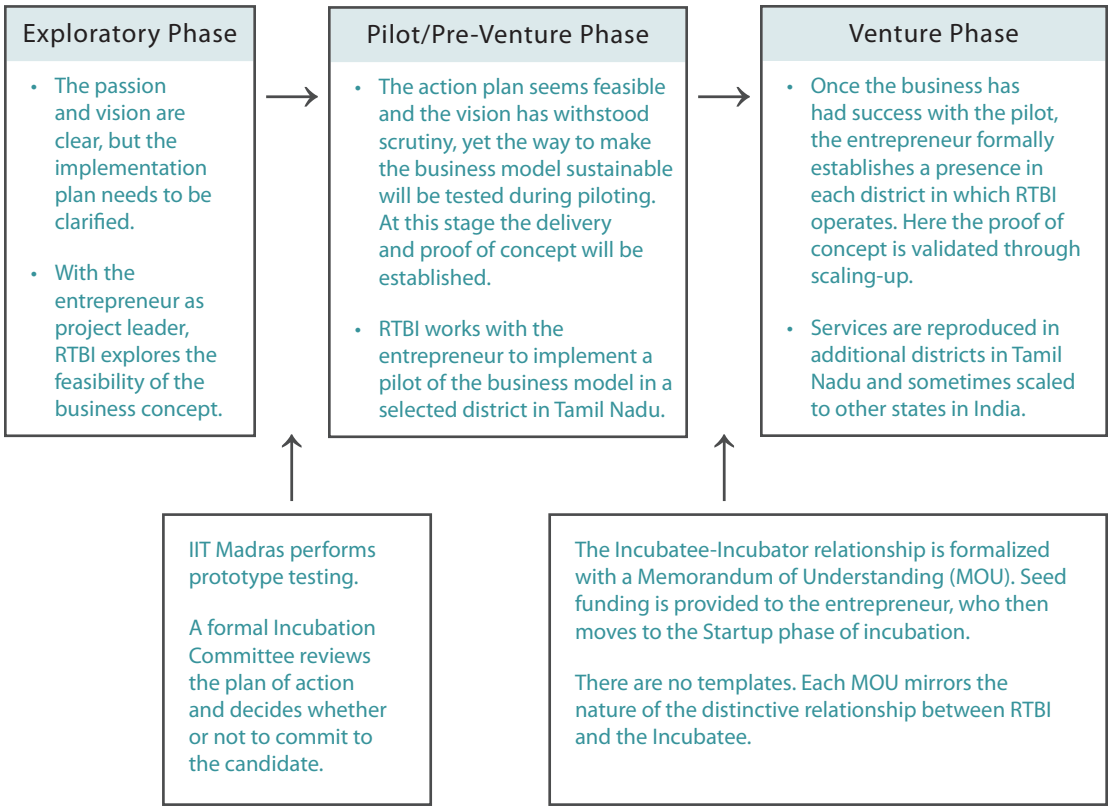
RTBI receives funding from four core sources: through grants and donations from the Government of India, primarily the Department of Science and Technology; through corporate social responsibility grants from private sector companies like IBM; from InfoDev; and from IIT Madras.

RTBI's Incubation Process. Entrepreneurs typically belong to the vast network of IIT alumni or young professionals who have heard Dr. Jhunjhunwala share his vision for development at a public forum. These individuals work with RTBI to develop a prototype or business model that has proven viability in rural settings and potential for scalability.

How does RTBI fund its ventures?

RTBI provides US $2,000 on average in seed funding to incubatees, apart from the support that the incubator provides in terms of staff, mentorship, IT resources, and access to markets.

With a primarily social rather than financial hoped-for return, RTBI does not have a rigid pay-back structure for incubatees once they become independent. Instead RTBI determines a reasonable equity allocation for each incubatee, depending on the venture and the technology. That equity is then returned to the pool of money set aside for seed funding for future ventures.



The incubation process includes different phases that cater to their incubatees' needs, based on the maturity of their model as well as their pilot.

Every year RTBI selects 5-7 meritorious ideas from this group for incubation. Selection is based not only on the quality of ideas, but on the integrity, drive, and social consciousness of the candidates. Candidates who are selected display a passion for improving quality of life in rural areas through technology

The Story of an Early Incident: Discovery through Misunderstanding

The voice of Dr. Ashok Jhunjhunwala,
Founder and Chairman, RTBI.

Very often outsiders think, "Oh, people in the villages are just not ready to accept technology as a tool for improving their quality of life. It's too complicated for them."

But that is the wrong conclusion. We have to understand the minds of the villagers, their local contexts, and why they behave the way they do. We cannot assume that they are responding in a certain way because they are unable or unwilling to accept technology, or because they don't want better healthcare. In fact, it is quite rare that they refuse anything that is safe, beneficial, and affordable.

My colleagues at the Institute of Information Technology, Madras developed a portable medical kit that could help bring quality healthcare to remote areas of India. One day, we took it to a rural village and set it up in the center. As we connected the kit to a computer and set up the patient chair, a crowd of villagers gathered. Everyone was interested; one man practically fell over his friends in order to get a better look. A few of us decided to demonstrate in order to show the villagers how the kit worked.

Our product was a neurosynaptics medical kit that measured body temperature, blood pressure, pulse rate, and ECG, and we had connected it remotely to a doctor in a city. As a result, rural residents could benefit from a real-time consultation with a physician without the long, arduous, and expensive journey to the nearest hospital.

One of our technicians sat down to demonstrate. We attached the kit's sensors to his skin and turned on the machine. His blood pressure was normal. Then the villagers said, "Professor, you do it!" So I sat down and, fortunately, my blood pressure and temperature were also normal. When I got up, I again noticed the curious villager, who seemed even more curious than before. His eyes were wide with excitement, and he kept trying to get as close to the kit as possible. So I called to him: "Ok, you sit down now. It's your turn. We will have the doctor to examine you."

As soon as the curious man heard this he said, "Not me, not me..." And he backed away and then disappeared from the crowd. We called to a second person standing nearby and asked him to sit down. "Not today," he shook his head, "Maybe some other day." He didn't move. We tried to cajole a couple more people, but no one would sit down. What was happening, we wondered? We created an easy, affordable way for villages to receive medical care, and yet they do not seem to want to take advantage of it!

We then asked the internet kiosk operator for the village to try the machine. We had communicated with him many times and he had no reason not to trust us. Since he worked with us on a regular basis, we thought, surely he would not refuse. When I asked him to sit down, I noticed a terrified look in his eyes. He looked at me grimly and replied, "No sir, not me. Not

today." When I started to gently push him to sit on the chair, I saw him touching the instrument very lightly and frenetically with his fingertips before backing away entirely.

As we drove away—perplexed by what had just occurred—a realization struck me. We had made a drastic error.

Electrical connections and voltages in the villages are rarely controlled: They can be extremely low and then become dangerously high with no warning. It is quite common for a villager to experience many mild but painful electrical shocks every year. The way villagers deal with this is that when they work with electrical goods first they quickly, lightly touch the equipment with their fingertips. Then, if they feel a mild electrical shock they withdraw. If they feel nothing, they continue their work.

But there we were asking villagers to sit on the chair with electrical equipment wrapped around their bodies. In the villagers' minds, it was common sense not to connect your body to anything that is also connected to electricity. When we tried to get villagers to test out our neurosynaptics kit, we were essentially asking them to risk their personal safety.

And we realized that this would simply never work—regardless of how good our technology was, and regardless of how much it could offer the village. It is a given that electrical installations will be very poor in the villages, and regardless of efforts to change that, villagers will simply not feel secure with electrical equipment. "What do we do about this?" my team asked. Although it took us a few hours to figure out, the solution was as simple as changing our design so that the connection between all the equipment was wireless. We then ran the medical kit through a battery.

After rebuilding the kit, we returned to the village. We placed the medical kit away from the computer on a separate table so that the villagers could see that there was no wire between them. Everyone saw that the medical kit was not connected to an electrical socket. Suddenly, we had volunteers. As a result of this simple design input, we overcame initial resistance.

Health Practitioner using telemedicine to examine patient.

Now, about 75 percent of villagers in Tamil Nadu receive tele-consultations, thereby significantly reducing the need to travel to urban areas for healthcare. Another significant impact is that patients approach healthcare much earlier in the disease lifecycle.

Unless you understand the minds of the villagers, you would probably think that the villagers are very reluctant to use technology, even though that is not at all so.

innovations and applications, a keen entrepreneurial spirit, and alignment with RTBI's goals. These goals include:

1. Leveraging information and communication technologies (ICT) that improve the general welfare of underserved communities using a social development approach;
2. Supporting the incubation of young entrepreneurs who strive to build inclusive, rural business models where local communities receive the bulk of the return on investment; and
3. Facilitating communication and interaction between urban and rural India to advance new socially responsible business paradigms.

RTBI then collaborates with entrepreneurs to achieve these goals by conducting comprehensive market research, as well as providing mentoring services, infrastructure support, identity and branding development, and loans and seed funding.

Technology Innovation and Social Development in Rural India: Lessons Learned

Lesson 1: Rural areas require technological innovations that take into account local contexts

The previous story illustrates the importance of understanding local contexts and local mindsets when trying to implement development solutions. The fact that rural areas require solutions that take into account local contexts should not be news to any reader. And yet this lesson is implemented in theory with much greater ease than it is implemented in practice. While it is unreasonable to expect every rural citizen to become an IT entrepreneur, it is equally unreasonable to expect all outsider product and business development to yield perfect solutions. Without an understanding of the context and needs on the ground, even the best intentions will lead to misunderstandings and missed opportunities.

Appropriate
+
Accessible
+
Affordable
=
Effective Rural Solution

Any technological solution meant to serve rural villages in India—whether it targets health, education, or agriculture—must take into account the challenges and realities of day-to-day life in those villages. Just as RTBI founders learned first-hand that villagers have a well-founded fear of electrical hook-ups, entrepreneurs in general must not assume that every innovation is the right innovation for rural markets.

The first step in making an innovation effective is to ensure that it is appropriate. In other words, the solution must not require a more advanced infrastructure than the one that is currently available in the village to function. Like the LED lights described in the box below, innovations must not create a dependence on external or non-renewable resources, as is sometimes the case when new technologies are introduced into local contexts. In addition, the solution must not require drastic behavior shifts from villagers.

Second, a solution must be accessible. The parts, knowledge, and skills to operate and use the innovation must be readily available. It must also be affordable; if the villager cannot afford to pay for a solution, then that product or service is highly unlikely to become a business that can be sustained without grants, loans, or donations. RTBI works closely with IIT's TeNet Group to develop solutions that take into account these key elements. Once a prototype has been created and tested, RTBI provides the research support and market analysis expertise to help develop it into a sustainable business.

Lesson 2: Entrepreneurship is key to sustainable development

The sustainability requirement is key not only to ensuring a lasting impact, but it is also critical to RTBI's social development goal. A sustainable solution means that the innovation is affordable, appropriate, and accessible and that it becomes integrated into daily life, freeing up hands and minds to develop additional solutions and innovate independently.

To achieve this, RTBI maintains a paradigm of sustainability throughout its entire incubation process, from the entrepreneurs who are selected to the way in which the partnership evolves.

The Entrepreneur. RTBI's entrepreneurs possess a proven appreciation of the primacy of the "rural context" in enterprise creation and therefore possess a willingness to work with the village community to identify appropriate areas of focus. They also understand and appreciate the villagers' unique skills and capabilities that new innovations could leverage. Importantly, RTBI entrepreneurs exhibit proven business acumen through their previous endeavors.

The 'entrepreneurial spirit' is a quality that, while difficult to define, is well understood and sought after by RTBI's team. It features a synergy with RTBI's vision, the work ethic to persevere through difficult set-backs, as well as clarity of mind and a keen understanding of the countless opportunities the rural market provides. In addition, entrepreneurs must possess less tangible qualities like humility and integrity that help them win the villagers' trust.

For the entrepreneur, the hoped-for return on investment is not just financial; by contrast many could make much higher wages through employment in the private sector. Instead, they choose to innovate with a return-on-investment (ROI) goal being social development and improvements in quality of life for India's rural populations.

The Partnership. One of the benefits of taking such care in selecting suitable incubatees is that, from the very outset of the incubation process, RTBI places a great amount of the responsibility for the success of the business venture in the hands of the entrepreneur. Even before approaching the TeNet Group and RTBI, entrepreneurs have proven their commitment to and

An accessible solution

My company created the Zonlight, an extremely compact, energy efficient, and cost effective solar LED based task-light. The light does not require electricity and provides light for villagers in their homes at night.

The white light enables people to utilize time after sunset for income-generating activities like blacksmithing and weaving, as well as for household chores like cooking and grinding. Importantly, the light provides a way for children to study at night and is bright enough that they will not strain their eyes. The light is environmentally friendly and has reduced villagers' dependence on the electrical grid.

Mr. Rama Thombara, a shopkeeper from Ranshet Village in Maharashtra, uses Zonlight in his shop and at home for 5 hours every day. He has stopped using kerosene lamps and torches, which can cause fires.

Mr. Harsha Langhya Lendi, a farmer from the same village, uses Zonlight at home and in the fields for more than 8 hours every day. As a result, he saves 6 Rupees everyday on kerosene usage. He expects to finish paying for this product in four months.

- KUSHANT UPPAL, CEO, Intelizon Energy

Patient from the village of Keelasevalpatti receiving exam from Health Practitioner.

engagement with India's villages as they develop innovative business solutions. RTBI then works closely with them to set priorities and goals that take into account villagers' challenges, aspirations, and requirements.

Meeting all these requirements does not come at the expense of quality. By contrast, RTBI and its incubatees work hard to ensure the highest quality standards at every stage of work. Nevertheless, throughout the entire process, RTBI ensures that the entrepreneur maintains ownership and agency over their venture. Thus, the process of research, market analysis, piloting, validating, and scaling is also one of mentorship, sharing of ideas, education, and collaboration rather than simply a service RTBI provides to ensure financial success.

Once a venture is ready to enter the market, the entrepreneur makes the final decision whether to create an independent business or partner with an existing organization. In either case, even after the business leaves the incubator and the Group, RTBI maintains contact in the form of mentorship and information sharing, which helps guide the development of future ventures. Indeed, a venture's independence essentially represents a transition in the type of partnership the entrepreneur holds with RTBI. Contact remains constant, and lessons learned are still constantly fed back into RTBI's archives and databanks both through regular personal contact, as well as through Internet kiosks.

By remaining connected, RBTI makes the process of achieving its mission an iterative one both by creating businesses that empower rural India, as well as by remaining receptive to the lessons that can be learned as those businesses operate independently in the market.

Discoveries in the field

Sometimes we go into the field with a fixed agenda, but then our experience there opens up a completely new perspective for us. In one scenario, our team was visiting a village to work with farmers in investigating the development of insurance products for their livestock.

We discovered that the livestock itself acts as an informal insurance product for them. So when their produce crop fails, they make a living from their livestock. We found this to be especially true for marginal and small sized farmers.

- AGRICULTURE TEAM MEMBER, RTBI.

Lesson 3: Diversity of input is critical to innovation

RTBI's evolving relationships with entrepreneurs and other partners help strengthen an already broad and diverse network of people committed to social development in India. These individuals hail from varied fields, such as energy, agriculture, education, health, water management, and finance. The thread that binds the vision of this diverse group is their belief that information and communication technology is a critical means for improving the lives of the rural poor.

The basis for welcoming such a broad scope of entrepreneurs stems from a recognition that closing the gap between India's rich and poor will require change that transcends sectors. To manage this network, RBTI maintains a core team of employees who coordinate communication and collaboration between the different sectors. This involves a continuous dialogue with entrepreneurs, virtual and live discussion fora, and frequent visits to the villages for all.

The Rural Setting: A Snapshot

The challenges that villagers in remote areas of India, as well as in rural parts of many other countries, often seem endless and insurmountable.

Villages are located in isolated areas, far from basic education and health services. Such physical remoteness increases villagers' vulnerability to public and private corruption and frequently leaves them helpless during times of flood or drought. Additionally, there is often no or, at best, unreliable public transportation to the nearest clinic or government office. Electricity can be unreliable and, as illustrated in the previous story, dangerous.

Shopping in Indian market.

Furthermore, villagers are often illiterate and typically have very little or no money to pay for education and healthcare. They must often rely on subsistence farming to meet everyday dietary needs, and yet the land they live on is becoming degradated and natural resources depleted.

While RTBI recognizes these villagers as comprising a market for innovation in their own right, RTBI seeks primarily to nourish entrepreneurship and innovation that helps villagers address and overcome the challenges above.

A weekly, in-person sharing forum for all incubatees helps transfer learning from the diverse venture teams across the different sectors of incubation. Business professionals, practicing entrepreneurs, technology specialists, and designers are invited to these discussions for greater exposure and inclusivity. As a result, members constantly explore the overlap and transferability of lessons learned among the different venture areas—through both formal and informal fora. Furthermore, new teams are established as needed by emerging venture sectors. This framework allows RTBI to remain a relatively small organization with low overheard costs while at the same time leveraging a large network of individuals actively involved in a number of local communities. Four key areas of RTBI's work are described below.

Health. Rural India suffers from a high rate of mortality and preventable diseases largely as a result of poor or non-existent health infrastructure. In addition, there is a lack of access to skilled and well-trained physicians. While India continues to churn out large numbers of well-trained doctors, the majority choose to either go abroad or work in wealthy, urban areas. RTBI's Health arm increases the availability of quality care and access to affordable services. Importantly, ventures also emphasize the benefits of disease prevention, early detection, and early treatment.

- One venture seeks to improve access to quality, comprehensive healthcare in rural areas by establishing and managing a network of existing, non-formal health practitioners. These practitioners are selected and trained to address common health problems, as well as provide essential preventive care. This process is facilitated through the use of ICT.

Stephen's Story: Gaining Skills, Building Confidence, Making an Entry and Leaving an Impression

Stephen is 30-years-old and lives in Kosapet village in the Red Hills block of Tamil Nadu's Thiruvallur district. He is an unskilled plumber by occupation, and his income is barely enough to feed his family of four. His wife works as a contract laborer in a nearby construction site to supplement family income. For the past two years, Stephen has been struggling to make ends meet and has been falling further into debt.

The kiosk operator (KO) closest to Kosapet is a local information entrepreneur who has been engaged in the implementation of a Security Training Pilot venture since early 2008. The Pilot trains villagers to become security guards, and the KO asked Stephen to join the program. Having completed the 10th grade, he was eligible for the course.

Stephen responded with hesitation and caution. Participating would mean moving into a completely different line of work. The time he would spend learning this new trade would carry significant short-term financial expense. The KO persisted, and Stephen was enrolled in the first group of trainees. The program deferred his fee until he was able to pay for it out of the higher salary he would hopefully receive after the training. Stephen's main motivation to join was the pilot's promise to find him a steady job.

Stephen found the training surprisingly enjoyable and interesting. The bi-lingual package came with visual aids that helped him understand complex challenges like fire hazard responses to simple daily greetings, standard dress code, and other social etiquette. Learning spoken English was a challenge, but it did not deter him from his new path.

During the interview with the company representative partnering with RTBI on the project, both Stephen and the kiosk operator were nervous. But Stephen was recruited easily on account of his physical stature, ability to comprehend the security requirements, and his overall communication skills. He was placed at Cognizant Technology in Chennai for a salary of Rs.5600, a significant salary increase compared to his previous work.

Stephen knew that this was the beginning of a fresh start for him and his family. He is seen standing on guard at the entrance to the Cognizant building exuding a confidence that he never knew he possessed.

Security Training in progress in a village in the Thiruvallur District.

- Another venture aims to provide effective, accurate, and timely diagnostic support to rural areas. The goal is to ultimately bridge the health gap between the urban and rural spaces, and to improve the health indicators of targeted rural areas using ICT as a platform.

Agriculture. One of the challenges for farmers in rural India is their lack of access to market information. This creates an imbalance in bargaining power with urban buyers. The buyers tend to be companies that have the resources and information to influence the market. RTBI's Agriculture arm empowers local farmers to make knowledge-based decisions with regard to weather, crop choices, and market prices and patterns, thereby moving towards greater efficiency in production cycles.

- One venture provides complete life-cycle support in terms of products and services to farmers in the Theni and Nagapattinam districts of Tamil Nadu. ICT entrepreneurs in villages have partnered with institutions like Tamil Nadu Agricultural University (TNAU) and the Centre for Indian Knowledge Systems (CIKS) to make their visions become reality. The venture's franchise centers are distributed across several villages and act as nodal points for dissemination of information and aggregation of products and services for that particular region. Centers feature low-cost micro-weather monitoring systems, Internet access, and a dedicated portal specially developed for this venture.

Local products, global market

ROPE (Rural Outsourced Production Enterprise) links rural artisans and craftsmen to an international market for their products. ICT support through online production coordination and supply chain management allows villagers to reach a global customer base.

Artisans and craftsmen often live hand-to-mouth, with an unreliable, small customer base. ROPE has guaranteed continuous employment for these villagers, while leveraging locally-available natural fiber resources in and around the villages themselves.

- SREEJITH NN, CEO, ROPE

Education. Rural areas tend to lack quality programs and institutions that provide consistent, cost-effective, and appropriate educational services. RTBI's Education arm works to address these issues by creating sustainable business models for the provision of education in curricula-based testing and training, basic courses in computer skills for new users, and programming and animation for rural youth. ICT entrepreneurs use Internet kiosks to deploy diverse technologies such as Learning Management Systems, Flash-based course modules, and Scratch animation.

Vocational Training. RTBI's Vocational Training arm provides employment opportunities to unemployed rural youth 18-30 years of age. The venture currently targets high-growth industries with employment potential and provides end-to-end employment solutions in the areas of private security and mobile services, retail sales, and marketing. The venture's selection and training of potential employees is conducted in centers distributed across the Thiruvalluvar district of Tamil Nadu and is facilitated by a local ICT entrepreneur in each village. The venture aims to provide employment to approximately 80 youth per month.

Lesson 4: IT is the tool, not the goal

India has made major achievements in recent years using technological innovations in urban areas. Initially, Western countries were concerned about security and quality when outsourcing work to urban India. Now, urban India is considered not just the IT services center of the world, but also a major global technology design house. Yet RTBI has learned through its work that business models based on ICTs alone are not sufficient for successful entrepreneurship or sustainability.

ICT is an enabler and must be used to facilitate business models that serve the needs of, and are relevant and appropriate to, the potential customers they serve. Building around prior domain knowledge, matching business ideas with the skills and interests of the local entrepreneurs, and exercising sensitivity to geographic, socio-economic, and cultural contexts allows for more sustainable, organic growth.

ICT is a key tool for RTBI, as well as RTBI's Entrepreneurs. One example of RTBI's use of technology as a tool is its Internet kiosks, which serve as key communication hubs for RTBI and its incubatees.

These kiosks include essential equipment, such as a wireless signal receiver, a PC with necessary software and peripherals, and battery back-up. The first kiosks offered only Internet and phone services to villagers, but after adopting digital cameras and other hardware, kiosks expanded to facilitate more services. Villagers use the kiosks to communicate with relatives in cities and conduct research on health and agriculture issues, as well as seek new employment opportunities in the region. Kiosk operators are local men and women from the villages themselves, who typically have at least a 12th grade education and enough motivation to run their own businesses. The villagers pay for the kiosk services they use at a discounted rate.

Commuters in village street.

In recent years, these kiosks have also increasingly served as telemedicine hubs and online education portals, bringing to rural villages tools and interaction previously only available in urban areas. For example, the kiosk in the Nemanthapatti village in the Sivagangai District began by providing video conferencing services to help villagers connect with their relatives residing abroad. In recent years, the kiosk expanded its services to offer health training, education, and information on passport and visa status, as well as bus and train ticketing.

Given the unreliability of electric power throughout India, uninterrupted power supply (UPS) units and battery back-ups have proven essential. Wireless base-stations are used in rural regions where laying long cables would be prohibitively expensive. They provide medium-speed upload and download capabilities along with simultaneous telephone services. Basic infrastructure also includes tall towers with a 25 km line-of-sight range. The technology may not be considered state-of-the-art, but it is adapted to function reasonably well in village contexts.

A Picture of Success

Dr. Ashok Jhunjhunwala originally conceived of RTBI with a distinct vision: to create wealth in rural India by addressing social challenges, such as lack of access to education and training, clean water, basic health services, and market knowledge. Success at RTBI, as the organization grows and matures over time, will be defined by the extent to which this vision is achieved and brought to scale through partnerships and the passion of individuals, with ICT as the primary tool. This includes: 1) seeing that India's rural populations have their most basic needs fulfilled, and 2) creating a broad network of people and businesses

dedicated to leveraging technology to increase the quality of life in rural India by empowering villagers themselves.

Founded in 2006, RTBI is a young organization. In the coming years, as more ventures mature, RTBI hopes to be able to measure impact beyond statistics on the uptake of their services and the number of projects that become independent. One way might be to measure impact of the ventures on rural GDP. Another less tangible measure would be to benchmark villagers' perceptions of and attitudes towards these ventures over time.

Sustainability is a crucial element for improving the rural economy and addressing each community's unique needs. Towards this end, RTBI favors a business approach rather than a charity or subsidy approach whose effects are short-lived. It is this understanding that informs the conceptual foundation for RTBI's implementation and piloting methodologies.

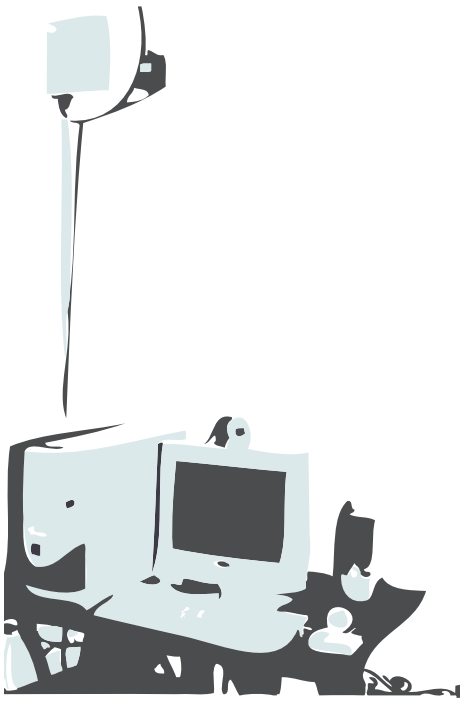
Continuing Challenges

Building a foundation. Since RTBI was founded in 2006, many of its operational processes are continuing to mature, making current structures as much *experiments* as they are necessary processes. This is helpful in the long-run by preventing RTBI from becoming wedded to legacy systems that outlive their efficacy. It also means that the work environment at RTBI can be hectic and that success often relies on individual leadership and innovation.

Relationships: Managing continuously evolving partnerships. With such a vast network, RTBI must manage a diverse set of relationships that is constantly shifting and growing. This can be challenging when individuals come from very different backgrounds and geographies. Additionally, some partners may transition from entrepreneur to advisor, to eventually becoming a funder. RTBI also works with a number of companies that contribute funding or technology to business ventures.

Child playing in small village in India.

Translation: On-the-ground realities of achieving a broad vision. As every project manager knows, the on-the-ground realities of working in the field often present unexpected obstacles and require constant creativity, flexibility, and unrelenting patience. While creating wealth in India's rural areas through social development is a vision that resonates strongly with everyone, RTBI staff must think practically at every step about how to translate that vision into everyday operations. This involves dealing with on-the-ground problems while maintaining a broader set of principles for achieving success: What are the supporting technologies involved? Are there hidden costs to a certain approach? Does a certain solution alleviate one problem but ultimately create new ones in other areas? These are all questions that RTBI staff must keep in mind while tackling specific problems through business solutions. Importantly, being able to think from the villager's perspective and embrace that mindset has proven to be a critical part of success on the ground. This process is not always obvious, but the returns are extremely high.



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