

IT Innovation Landscape in India

(By Sharad Sharma, Written for NASSCOM India Leadership Forum 2007)

This article is an interpretive look at the innovation landscape in India as seen through the lens of the NASSCOM Innovation Awards. It is necessarily a subjective perspective focusing on weak signals and emerging trends. It also takes a rather unconventional view of what underpins innovation in India concluding that the Indian innovation experience is quite different from the Western model.

The Indian IT and ITES industry is now big even by global standards. Though it may not be visible at the surface there is a strong innovation theme that's running through the system. Understanding this innovation theme is not straightforward. Just like the country itself, things look chaotic from afar. It's only when you look deeper do the patterns become visible.

One thing that is immediately obvious is that there isn't just one innovation ecosystem at work. There are many. This article looks at *four* of them. Despite the inevitable overlaps, they are quite distinct from each other. They are also at different stages of maturity.

A good place to start our interpretive study of the innovation landscape is with the IT Services sector of the industry.

***Jugaad* Innovation Ecosystem – Roaring Success**

In the last 20 years, IT Services has gone from being a minnow to an elephant. Strange as it might sound to some, the reality is that this enormous growth hasn't been a straight line; it has been punctuated by major challenges along the way.

For instance, way back in the early 90s, when the tariff barriers in India came down dramatically (effectively killing the domestic server vendors), a product engineering services industry took off and the notion of R&D-for-hire was born. Another inflexion was the shift from onshore to offshore, in part, precipitated by the visa limits getting exhausted in late-90s. When the offshore application development and maintenance growth threatened to cool off after the Y2K boom, the industry broadened offshoring into a number of new areas and the BPO industry took root.

These repeated bounce-backs and course-corrections can be attributed to a powerful, gritty, improvisational energy that's been running through Indian society for some time. Up in the north of India, people call it *jugaad*-innovation. Its core tenet is to not give up. It insists that a practical solution can be found for any problem through intense experimentation. And it encourages getting off the beaten track in search of a solution.

Double-Tongued Dictionary, which documents words from the fringes of English, describes a *jugaad* solution as an "improvised or jury-rigged solution" exhibiting inventiveness, ingenuity, and cleverness. Singapore's Strait Times, in an article on "What's culture got to do with IT?" talks glowingly of the "*jugaad*" factor and the "innate ability of every Indian to do an improvised quick-fix".

When the Indian economy was closed, this type of innovation was needed to just survive. As the economy opened up, Indian industry re-purposed this *jugaad*-innovation to create globally competitive companies in a range of industries. For instance, most analysts, even domestic ones, had written off the Indian manufacturing sector. But it didn't die. It transformed itself. It took on a new form. It's now back in the reckoning. Tata Steel is a good example of this. Despite heroic odds, it emerged to become the lowest-cost steel plant in the world.

It's the same *jugaad*-innovation spirit that's been behind the repeated bounce-backs of the India IT Services industry. Every setback has made the key players stronger. Now TCS, Infosys, Wipro,

Cognizant, Satyam and others are reshaping the global IT Services industry with their global delivery model.

Some people prefer to call this unmistakable innovation energy as constraint-based innovation or problem-solving innovation. No matter what you call it, this is at the heart of the strong business model and the process innovation capability that the Indian industry has today.

What started off as an innovative spirit has now morphed into a whole innovation ecosystem. This ecosystem has a variety of market participants who quickly align behind any new constraint or problem and offer practical business model or process model solutions. Their success stories have created a self-sustaining momentum. Today this ecosystem is strong, vibrant and mature.

Jugaad-Innovation Ecosystem at Work

The mobile industry in India is on a tear. In this boom, Bharti Airtel has emerged as the poster-child for a lean wireless operator. It has higher margins than conventional mobile operators despite having a substantially lower average-revenue-per-user (its ARPU is only 20% of what it is in the West). It's no exaggeration to say that today Bharti Airtel's lean business model is as significant to the rest of the telecom industry as Wal-mart's business model is to the retail industry, or SouthWest's business model is to the airline industry.

How did Bharti Airtel get here? It is *not* a result of a single grand insight. Instead, it's a result of several small business model experiments that coalesced and accumulated over time. What's more, as is typical of an innovation ecosystem, Bharti Airtel didn't do it all alone. It benefited from a number of partners that had also embraced the same *jugaad*-innovation philosophy. One such partner has been IBM. Yes, IBM. In a very true sense, IBM has gone multi-local. It has become part of India's *jugaad*-innovation ecosystem.

As a testimony to their strong innovation partnership, this year NASSCOM has chosen **Airtel-IBM** together as one of the finalists for the Innovation Awards.

In many ways what's happened in the telecom sector is not an aberration. In many sectors, there is collaborative business model and process innovation happening. The results are radical but they are always built on iterative and experiment-based baby-steps.

For instance, another award finalist this year, **Kale Consultants** is bringing the benefits of the *jugaad*-innovation to the airline industry. Kale does that through a service called REVERA targeted at airline passenger revenue accounting. This is not a conventional BPO service. Kale brings its own software, facility, business process and people to the table. Rather than charge on headcount, it charges a transaction fee. It aggressively looks for productivity improvements. For example, it will try and significantly bring down revenue leakage due to faulty administration of fare rules by travel agents. This kind of a collaborative approach is extremely useful for the airline. Kale's singular but relentless focus on improving revenue accounting allows the airline to better focus on flying its planes and finding the passengers.

Jugaad-Innovation Ecosystem is Evolving

When it started out the *jugaad* mindset was a gritty, never say die, improvisational energy source. It's become much more than over the last ten years. It has acquired rigor through a deep embrace of continuous improvement methodologies.

This evolution of the *jugaad* mindset has had tangible outcomes. In manufacturing, India now has the more Malcolm Balridge Quality level award winners than any other country except Japan. In software development, India has the largest number of SEI CMM Level 5 certified software development centers. In the workforce, there are large pockets that practice tools like six-sigma, theory of constraints, etc.

This co-opting of analytical thinking into the traditional *jugaad*-innovation mindset is strengthening the innovation ecosystem in two ways. First, by helping surface new constraints earlier in the game, it is making the improvisational solution-finding cycle more strategic. Secondly, it is leading to the creation of specialist analyst firms. A good example of this is **Evalueserve**, another award finalist this year. It sells its industry and data analytical skills to others. By being able to do this remotely, it has made deep analytics accessible to a whole new set of customers.

This evolution of *jugaad* innovation is remarkable. Only twenty years back, it used to be applied to the aid of survival. Then it got re-purposed to help domestic companies deal with change and become globally competitive. Now this has evolved again. It has made itself available to any company worldwide. Today any company wanting to retool its IT Systems, processes or business model can now tap into this thriving *jugaad* innovation ecosystem through the IT Services, BPO and KPO firms operating out of India.

So, as we have seen, *jugaad* innovation is an important part of the innovation landscape in India. Yet, this is not the only innovation ecosystem at work in the Indian IT industry at this time. In recent years, a product ecosystem has started taking shape as well.

Product Innovation Ecosystem – Rapidly Maturing

An IT product ecosystem is rapidly maturing in India. There are several reasons behind this. First, there is a now pool of experienced entrepreneurs who have gone through multiple product lifecycles. Many in this pool have acquired the experience in the captive R&D centers in India and there are others who have returned home.

Second, there is venture capital is now available for product companies. This makes the initial upfront investment in R&D and marketing possible. Third, the support system of specialist firms – legal, design, testing, etc. – has now come up.

Fourth, the social support for entrepreneurship is growing. There are a number of support forums like TiE and NASSCOM that are available. Now even parents and academia celebrate entrepreneurship.

All this augurs well for product startups. This positive momentum is reflected in the NASSCOM awards process. This time, 3 of the 7 award finalists are product startups.

Right now the Indian product ecosystem is tightly coupled to the Silicon Valley ecosystem. VCs, seasoned professionals and market insights are freely flowing back and forth between the two ecosystems. The dominant startup model is the cross-continental model where the customer facing roles are based in the US and the business strategy and engineering roles are based in India.

Another noticeable change is that the Indian product startups are becoming savvier at anticipating market needs and then making appropriate products bets. Take **Ittiam**, one of the finalists, as an example. Ittiam is a young startup narrowly focused on DSP solutions. On the technology side, they have chosen to bet on Texas Instrument's stack. On the market side, they have gone deep in just three areas. One of these areas is the in-flight entertainment system market. Despite their strong technology heritage, they have been able to take an outside-in perspective to develop key insights on the future of in-flight entertainment systems. This has enabled them to offer a cutting-edge DSP solution that is also customer-relevant. They are well on their way to becoming the platform of choice in that space.

Another award finalist, **Strand Lifesciences**, is also an example of a startup bridging two worlds – the technology world and the customer world. Strand focuses on drug research companies. It has immersed itself deeply into the drug discovery process and has developed analytical and

simulation tools for researchers. They have invested heavily into their products and are now being rewarded with growing market traction.

Both Ittiam and Strand are promising success stories. They are showing how sitting in India they are able to leverage industry touch-points across the world. This outside-in approach is now visible in the consumer product space as well.

As example of this is **Monsoon Multimedia**, another award finalist. It has created a white-labeled home device for place-and-time shifting. This slim box, the size of a hardcover book, is now starting to be sold by electronics retailers like Fry's.

By their very nature, product ventures take 3-5 years to mature. So, one way of looking at the product ecosystem is to think of it as a pipeline. This pipeline is beginning to see some healthy milestones. Last year, iFlex got acquired for over a billion dollars by Oracle. Another firm, Tally Solutions reached a milestone of selling over a million copies of its entry-level accounting system. This year, Tejas Networks, an optical products firm, will probably do an IPO.

The product startup pipeline also indicates that while things are improving, there are some areas that need attention. For instance, there is a need grow the number of product managers, product architects and product release managers by getting universities involved in the process and by nurturing special communities for practitioners. Angel investing is another area that needs to be strengthened.

The overall picture for product innovation ecosystem has significantly improved in the last two years. This momentum is likely to continue, in part, this is because the local domestic market opening up. The local market is not only shoring up the product ecosystem; it's also underpinning the creation of another related ecosystem.

Bottom-of-the-Pyramid Innovation Ecosystem – Nascent But Promising

Bottom-of-the-pyramid (BoP) is a big opportunity segment for IT. Right now little or no IT is consumed by micro-firms. India alone has more than 7 million micro-firms that are otherwise doing well and are hungry to leverage affordable IT. If the IT industry can figure out the right type of affordable solutions then a whole new wave of consumption will get triggered.

India has done very well in applying Prof. C. K. Prahalad's ideas to create breakthrough BoP solutions is healthcare (e.g. Narayana Hrudayalaya), agri-markets (e.g. eChoupal) and related areas. This has created a nascent BoP innovation ecosystem. Admittedly, it is still not very mature but it is now turning its attention to the IT space.

A BoP innovation ecosystem is similar to a product ecosystem but has important differences as well. One difference is that BoP solution is almost never a tweaked version of what exists today. Jeffrey Immelt of GE, summed this up in a recent interview saying that "the right solution is not an American product stripped down to meet an Indian price, but a truly Indian product designed from the ground up to carry an Indian price".

Even more important difference is that, very often, the final solution is not be a product at all! It ends up being some mix of products, internet services, mobile content and micro-franchising. So creating this solution requires not only breakthrough product architectures, process models and/or business models, but also building of new market structures and value chains.

So building a BoP solution is a daunting challenge. The only way to meet this challenge is to embrace *in-market* incubation of products and business models.

India is fast emerging as the preferred incubation lab for BoP solutions. There are three factors driving this. First, India has the most experience with BoP solutions till date. Second, the rapid

economic growth has created favorable market conditions for BoP solutions in a range of areas, most certainly, including IT.

Third, the early BoP incubation efforts have had promising results. For instance, Texas Instruments has launched an ultra-low-cost-cellphone chipset, LoCosto, which was conceived and engineered in India. Intel has experimented with its Classmate solution to tackle the One-Laptop-Per-Child opportunity. Nokia has struck gold with its inexpensive no-frills made-for-India handset whose killer feature is a built-in flashlight.

A promising BoP incubation effort was named as one of the award finalists. **HP Labs in India** has developed a touch-keypad specifically for Indian non-English speaking consumers who are not familiar with the QWERTY keyboard. This keypad's significance is that it makes a number of rural applications accessible to rural India.

Even though BoP innovation ecosystem is still at a nascent stage of its evolution, its emergence is a very promising development not just for India but also for the entire IT industry. This could open the door to a whole new world of consumption of IT products and solutions in a hitherto untouched segment of the market.

Invention-centric Ecosystem – Still Getting Started

BoP solution incubation is inherently an *immersive* outside-in activity. This is about as different from the conventional invention-centric, inside-out, model of innovation as chalk is from cheese.

This traditional invention model has been centered on research labs either inside the firm or in a university. These research labs create fundamental technology breakthroughs that then get commercialized as new products and features.

This invention-centric ecosystem is still getting started in India. Technology research labs are very new and have only come up inside a few MNC IT firms. The universities haven't yet jumped into this area with vigor. This needs attention. One idea floating around is to lobby for opening up of defense related technology work for local companies. Second idea is to encourage more PhD students in computer science and related areas. But the most important idea is to fix academic research in India.

Today too little academic research is happening in computer science. And whatever little is happening is not the right kind. Over the last ten years or so, academic research has migrated to emphasizing the multidisciplinary side. The language to describe this emphasis has evolved: it used to be inter-disciplinary, then became cross-disciplinary, and more recently it's trans-disciplinary. The idea is simply that it's not a union or intersection of your ideas and mine, but that working on the boundary yields new ideas for both you and me.

To introduce this trans-disciplinary research mindset requires changing the incentive structures and the organizational structures in our academic institutions. For instance the "department" has to become less fundamental as a unit than it used to be.

The open sky opportunity for academic research in India is to do with scaling not just in the area of data centers and computer networks but also in the area of wireless sensor networks. Hopefully momentum in this area will pick up and this invention-centric ecosystem will acquire legs in the years to come.

Wrap-up: Reason For Optimism

We have looked at four distinct, yet overlapping, IT innovation ecosystems in India. The *jugaad*-innovation ecosystem is the most mature. The products ecosystem is getting there. The bottom-

of-the-pyramid innovation ecosystem is off to great start. It's still nascent but promising. And clearly, what needs most attention is the invention based ecosystem.

If one looks through conventional eyes of invention-based innovation, India doesn't yet have a strong story to tell. But, as we have seen in this article, this would be an incomplete conclusion. India's IT innovation landscape is rich, vibrant and growing. Indeed, it's not a replica of what exists in the West and will not become one. This is not a deficiency; instead it's a definite strength.

The predominantly homegrown nature of Indian innovation landscape gives it durability. Also, the fact that it is well anchored to the societal fabric ensures continued dynamism. And by chalking its own path, India is not following but is innovating innovation itself.

With about one-sixth of the world's population in India, it is too big to rise out of poverty without creating wealth on its own. India growing innovation capability gives it that capacity for self-help. This can only be good news for the rest of the world.

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