Creating Entrepreneurship Ecosystem for Climate Technologies
Summary from a Work Undertaken for the World Bank infoDev

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A key contributor to the growth of an economy and development of a nation are the innovators, entrepreneurs, and SMEs. Clean technologies – clean energy, water, waste management, energy efficiency, clean transportation, etc. – are no exceptions. While large corporations take products to the mainstream and generate large impacts, Entrepreneurs and SMEs are the ones that feed in with innovative solutions and products. Hence, for the clean technology sectors to flourish, we must encourage and promote the innovative SMEs and create conducive environment for them.

The clean tech innovation and entrepreneurial ecosystem, essentially require six key elements:

(1) Technology – whether indigenous or transferred,
(2) Market – local and global,
(3) Policy – especially important in clean tech as policies create market,
(4) Capacity – of entrepreneurs, mentors and workforce,
(5) Finance – throughout the product life cycle – from technology development to commercialization to large scale deployment,
(6) International ecosystem – for both technology sourcing and marketing of products and solutions.

Let's understand the gaps in these elements one by one, in the Indian context.

Technology:

Most of the R&D in the labs and institutes are esoteric and far from market realities. These innovations mostly stay stuck within the labs. We must drive R&D based on market needs and commercialization potential. NRDC has finally taken some steps to see that the innovations from these labs hit the market and make some large impacts. They are still, however, not able to drive the R&D with inputs on market requirement. On the other hand, i2india have searched for such technologies in Indian labs and research/academic institutes, but have not been successful in getting any of these technologies out to market.

Technology transfer from developed nations is also not simple. The technologies must be adapted to the local needs and market conditions. I2India has been trying to do some of these, and they also realized that the technologies must be handed over to entrepreneurs for localization and adaptations to the local conditions.

There is barely any collaboration and information sharing between the R&D houses and amongst the researchers. Most R&D takes place in silos, and many times are duplicated. Many times, R&Ds taking place in silos end up nowhere, whereas if these could be brought together, some of them could become a formidable market solution.

There is not enough prototyping testing and demonstration facilities that entrepreneurs could use as shared resources, as these resources are quite expensive. Materials testing, measurement, verification, etc. are activities that could be used as shared resources, but are not readily available.

Market:

Entrepreneurs often lack market information to create viable business. They are usually too tech focused, and away from the market realities. There is hardly any attempt to track the market needs, as it requires people on the ground, at the field, gathering market data.

Consumers don't understand the value of these new technologies and are usually quite price-sensitive. Awareness must be created amongst the consumers for the benefits, and perhaps policy is the best policy to get this implemented. JNNSM and NMEE are such efforts that have now been initiated, and are welcome moves.

Policy:

Policies are key, as I just mentioned, because it creates market for new technologies with still nascent market penetration. In India, policy is mostly driven by inputs from government bodies and, at most, large corporations and large industry lobbies. These policies generally overlook the needs of the SMEs and generally are not SME friendly. Take for example, JNNSM. Very few SMEs are going to be benefited by these large power plants, which are usually large money game. There is some scope for SME suppliers, but most of them will not qualify as they won't me able to meet the large financial terms and conditions. Therefore, there is a serious need for a platform for SMEs to voice their concerns and influence the policies to impact their business.

Capacity:

This is my second most favorite and would like to dwell on it a bit longer. Even though we think that there are entrepreneurs all around, frankly speaking, we have more 'life-style' entrepreneurs than entrepreneurs in the true sense who help create jobs and make impact on the society. There is severe lack of seasoned entrepreneurs in India – even more so in clean technologies. At least IT sector hasnow become a bit more mature, not so with clean tech. At the same time, there is also a severe lack of trained workforce. New graduates and young workforce is more attracted to the glamour of IT world rather than the reality and less-glamorous world of clean technologies. Lack of heroes in the clean tech sector could be one of the reasons for this apathy towards a career in clean tech. The IT professionals are influenced and charmed by icons such as Nilekani and NRN, but where is such an icon in clean technologies? Now this apathy could also be because of the relatively lean and mean salary structure and financial rewards in the clean tech sector.

Entrepreneurs also lack end-to-end support for their business. They have different needs at the different phases of the business, and it is very hard to find someone that could hand-hold them throughout their journey.

And last, but not the least, there are really very few seasoned mentors to guide and handhold clean tech start-ups, and take them through their difficult journey.

Finance:

This is my most favorite subject and I will dwell on it a little deeper. Development and commercialization of innovation in clean technologies often require large investments and are risky, both for the innovator and for financiers. The need for investments and the appropriate funding resource depends upon the stage of innovation. While most innovation research and concept get some funding from government agencies such as TDDP, TePP, etc., the innovations are picked up and funded by venture capital world once the concept has matured and product has been at least prototyped and demonstrated. After that even conventional bank loans and PE funds kick-in for scale-up.

However, the most difficult period for the entrepreneur is the phase where public funds run out and private funds still don't kick-in when the prototype development and demonstration must be done. This is the valley of death. The financial world severely lacks valley-of-death funds. This fund is needed for prototyping, demonstration and business model validation, etc.

Another option for some of these funding could be debt through bank loans. However, conventional bank loans are neither available nor ideal for such financing since they are not adjusted to cash flows out of investments into innovations. Banks really don't have the bandwidth or the depth to understand clean technology sector. SMEs and entrepreneurs at this stage do not have any collateral to offer and hence are denied of such loans. Bankers are usually risk averse and choose to play in traditional "safe" sectors. They don't have an apatite for risk – even if the top management is ok, the at the branch level, the managers prefer to play is safe. This applies despite the credit guarantee schemes in place to cover such risky debts.

The last but equally important leg of financing is the demand financing. In case of clean technologies, the cost is a major factor and most clean tech applications require upfront investment. There is a lack of funds to finance the consumers to adopt these new clean technology solutions – especially to promote the technologies from the SMEs and innovative entrepreneurs.

SOLUTIONS?

So, what needs to be done? With extensive stakeholder engagement, a few solutions and actions were identified to bridge the gaps. We can categorize these solutions in three primary categories – Finance, Capacity and Ecosystem.

Access to Finance:

1. Establish a flexible high-risk early stage fund to address the valley of death – at various levels including proof of concept, pre-seed and seed. This fund will bridge the gaps when public funding tapers off and private funding kicks in. Make funding simple, transparent and easy to apply for.
2. "Crowd-in" multiple private sector investment – facilitate other sources of financing through syndicating investors, cataloguing existing sources of funding and building partnerships with banks to assist in accessing working capital finance.
3. Create a debt financing instrument for clean tech SMEs and overcome the barriers of the conventional banking practices.

4. Link market opportunities to technologies to attract funding – make entrepreneurs investment ready. Research and track market demands and trends, identify market needs, and match them to available technologies. Promote business model innovation to adapting technologies to local needs in India.
5. Work with the government to establish means of consumer financing. BEE is working to create a RTGF for EE projects. Others should also follow. Income-tax breaks are another option to cover the consumers, along with low-cost financing.

Capacity Building:

1. Build a pool of seasoned and trusted mentors available to entrepreneurs – prepare seasoned entrepreneurs and professionals to provide effective mentoring and enable local proximity to handhold entrepreneurs through company journey. Enable trusted match-making and create a system to recognize and reward the mentors.
2. Instill business and finance knowledge to the entrepreneurs who are typically technology experts. Teach soft skills to tech-savvy one-dimensional entrepreneurs. Provide entrepreneurial training and capacity building – in collaboration with incubators, TiE, NEN, etc..
3. Establish a platform to connect innovators to entrepreneurs - link technologies and innovations to aspiring entrepreneurs & SMEs. Network and train incubators.
4. Provide the entrepreneurs an access to market through appropriate partnership with industries and sales channels to reach the consumers.
5. Provide an avenue to recognize and reward 'heroes' in the cleantech sector.

Ecosystem Development:

1. Systematic facilitation of collaborative R&D with focus on technologies that create high impact solutions. A knowledge database with assessment of potential for localization of worldwide technologies. A support system for global collaboration on R&D, technology transfer and knowledge sharing through international innovation center network.
2. Provide and facilitate access to a range of analytical and market research products including the promotion of regulatory good-practice and innovation policy advocacy.
3. Build regional and technology specific clusters of innovation. Provide access to prototyping and testing facilities to innovators and entrepreneurs in their commercialization journey. Facilitate SMEs access to large industries to create technology partnerships, demonstration projects and manufacturing support.
4. A platform to connect innovators to entrepreneurs - links technologies and innovations to aspiring entrepreneurs, &SMEs.
5. Work with policy makers and government to raise awareness. Provide market and technology inputs from industry and experts in the SME sectors to policy makers. Provide entrepreneurs a platform for unified voice in the policy making.

In summary, the solutions outlined above are centered around providing access to flexible financing at a number of strategic levels, building capacity of new and existing enterprises, enabling collaboration and supporting an ecosystem that aggregates existing partners and facilitates interaction of innovative enterprises with large industry, and providing a hub for building international partnerships that can facilitate technology transfer and collaborative R&D, as well as business to business linkages.

A report for India's CIEC can be found at http://www.infodev.org/articles/india-climate-innovation-center-cic-business-plan-summary.