

TECHNOLOGY TRANSFER

NCL broadens terms of engagement with industry; Venture Center to nurture ideas to market

The National Chemical Laboratory (NCL), Pune, along with other laboratories under the Council of Scientific and Industrial Research (CSIR) are attempting to chart a new course in technology development, and commercialisation of scientific research. With past models of engagement with industry on transfer of technology having outlived their usefulness, and a sea change in the environment in which the institutes operate, the pressure has been on the industrial research laboratories to better serve industry and through them larger society. In response, the laboratories are attempting to evolve participatory, risk-sharing models of technology transfer and development, to better serve Indian industry.

Changed technology landscape

The changes in the landscape of technology development and the kind of technologies now required from publicly funded laboratories have changed significantly since the 1990s, when the Indian economy was opened up to the world.

For one, Indian industry today has a much wider access to technology — although, perhaps, not state-of-the-art. At the same time, businesses themselves have ramped up their in-house R&D spends considerably — at least in select sectors — in recognition of the fact that innovation can be a powerful driver for sustainable growth. For example, the R&D budget of Tata Motors exceeds that of the entire CSIR system, and is aided by more than 1,700 scientists. Similarly, several Indian pharmaceutical companies now each spend a few hundred million dol-

lars in R&D efforts ranging from process development and scale-up; to development of alternate, more efficient routes to synthesis; and on development of new chemical entities and formulations. Consequent to these developments, the pre-eminent position of CSIR in technology development in the 1980s has been eroded — at least in some sectors. This has forced the organisation to ask difficult questions as to how it can stay relevant.

In this soul-searching, has come the realisation that good science alone will not lead to good technology and that the journey from the laboratory — where an idea is born — to the market is a long and arduous one, needing multiple approaches and not the linear model of technology licensing that the laboratories were long used to.

In response, as an pioneering experiment, NCL has created the ‘NCL

BUSINESS PLANS

Venture Center: Nurturing businesses in their start-up phase

The Venture Center, initially occupying an area of 10,000-sq.ft. of build-up area within the NCL Innovation Park, consists of lab, office and ‘hot-desking’ space for start-up companies; shared laboratories and analytical facilities; advisory services for intellectual property and business planning; early stage funding; an information and learning centre; and other supporting resources and services.

The Center has been created with the aim of nurturing businesses through their start-up phase by not just offering space, but also access to technology support, business mentoring, scientific and business resources and a conducive and supportive environment. The ‘Lab2Mkt’ program is the Center’s flagship early-stage technology commercialization program.

The National Science and Technology Entrepreneurship Development Board, of the Department of Science and Technology (DST), Government of India, is expected to fund the Center in the near future.

So far, three start-ups with roots in NCL technologies have been mentored through the Center:

- Biopore Surgicals, a manufacturer of medical implants;
- Membrane Filters P. Ltd., manufacturer of ultrafiltration and nanofiltration membrane filters; and
- Tridiagonal Solutions, founded by NCL and IIT alumni, for offering services and solutions in the areas of computational modelling of flow and chemical processes.

Technology showcase: Polymer expertise from NCL

Technology	NCL competencies	Application ideas
Super-absorbent polymers	Water/alcohol absorbing polymers capable of absorbing 350-400 times its weight of water/alcohol.	Agriculture, absorbent pads, cooling wear, artificial snow, baby/adult diapers, sanitary napkins, wound dressings, sand bags for flood control, disposable urinals, medical waste solidification, water blocking tape for cables, absorbing pads for operation theatres, paint masking tapes, fire extinguishing gels.
Membranes	Gel separation membranes Ultrafiltration membranes Proton exchange membranes for fuel cells	Modules for home drinking water; online water purifiers; clarification of fruit juices; electrocoat painting of automotives; hydrogen separation; nitrogen separation; filtration water bottle/straw.
Silicones	Chemistry Modification Application (rheology, colouring etc.)	Hair care; hydrogel contact lens; rubber glass; medical adhesive remover; leak-proof liquid dispenser; structural sealants; silly putty; encapsulants for high beam LEDs; prosthetics; template for skin regeneration; ophthalmic surgical liquid; gels for personal care & cosmetics; rubbers for healthcare products; kitchen utensils.
Microcapsules & microspheres	Process for preparation of microcapsules and microspheres	Microencapsulation of drugs, flavour & fragrance compounds, biocides; pressure sensitive film; expanding ink; paper cup; soft touch paper; cultured marble; injection moulded products; cable filling compounds; polyester putties; embolisation of blood vessels.

Innovation Park' and a 'Venture Center' therein, that aims to create the eco-system necessary to nurture an idea from the laboratory and take it through the stages that will eventually see it emerge as a successful technology serving a market need. The Venture Center, incorporated in Jan. 2007 as a not-for-profit company under Section 25 of the Company's Act, has been floated within the NCL Innovation Park, adjoining the NCL campus. Designated as a technology business incubator, its focus is currently on the chemical, biochemical and

material sciences — all areas in which NCL has significant research programs.

From good science to good technology — the journey

According to Dr. S. Sivaram, Director, NCL, science has to be incubated before it is unleashed in the market, and the more fundamental the science, the less apparent its relevance and applications. "Scientists like to work at a conceptual level and are not good at walking the last mile to take a concept,

refine it and take it to the market, leaving a gap which only an eco-system dedicated to the task of translating good science to technology can fill," he said.

Dr. Sivaram was speaking at the inauguration of a one-day seminar in Pune on November 13 that showcased technologies developed at the Polymer Science laboratories of NCL and the landscape for financing of technology ventures.

Even the best of scientists, Dr. Sivaram pointed out, are not adept at

recognising the disruptive nature of their discoveries. For example, both the winners of this year's Nobel Prize in Physics could not then recognise that they had created the backbone on which the entire information technology industry one day come to be based.

According to Dr. Sivaram, taking nascent ideas from the laboratory and seeking opportunities in the marketplace, is far more difficult than contract research wherein the contours of science, technology and the market are well known and only incremental innovations are needed. At the same time, he stressed the need for keeping the clock of science ticking. "In the next 10-15 years, the technology landscape will change considerably, as will customer preferences. The relevance of good science, however, will not. India needs to embark on high risk science to reach technological leadership in the next 15-20 years."

Multiple modes of engagement

NCL is now open to multiple modes of engagement with industry, including sponsored research projects, consulting and technology transfer. While exclusive or non-exclusive technology transfer through licensing was the preferred route in the past, the laboratory is now in a position to part with its knowhow and intellectual property

SUCCESS STORY

Biopore Surgicals: Social angle to medical implants

A Mumbai-based company promoted by Dr. Vinay Agarwal, an ophthalmic surgeon, Biopore Surgicals is involved in the manufacture and marketing of polyethylene-based biomedical implants, which are used in maxillo-facial reconstructive surgery.

The first product from the company, an indigenously developed ocular implant, has received good response from the market and provided the platform for a broader range of products, all based on technology developed at NCL.

According to Dr. Agarwal, the technology-edge provides a significant reduction on capital expenditure in the processing stage, which allows Biopore to profitably launch products at one-third the price point of imported products.

This has not only provided the medical community a cheaper alternative to existing products, but more importantly, opened up the Indian market by providing a lot more patients access to advanced and more customised medical implants. "NCL looked at the social angle when betting on our company," Dr. Agarwal said.

In July this year, the company licensed the second set of technologies that will permit it to expand the range of offerings.

even for equity in existing or start-up companies.

The choice of the model depends on the nature of knowhow, intended markets and industry scenario; the stage of technology readiness; stage at which the commercialization partner enters; IPR and knowhow strength and ownership position; and the type

of relationship desired (transactional or partnership). "In May 2009, the Department of Scientific and Industrial Research, Government of India, permitted some publicly funded labs to take equity in Indian companies, as compensation for technology transfer," Dr. V. Premnath, Founding Director and Secretary, Venture Center said.