Interview

INTERVIEW WITH DR. S. SIVARAM, DIRECTOR, NCL

NCL looking to 'relationship model' to enhance association with Indian chemical industry

Dr. Swaminathan Sivaram, a graduate of IIT, Kanpur and the most authoritative polymer scientist in the country, did his Ph.D. from Purdue University, in 1971. Following a brief stint at The Institute Polymer Science, Akron, Ohio, USA, he joined Indian Petrochemical Corporation (IPCL) in 1973 where he held senior level positions till he shifted to NCL in 1989 as Head of the Division of Polymer Chemistry.

His research interests are predominantly in Polymer Synthesis which include anionic, GTP, Ziegler Natta, free radical and step growth polymerization; high performance polymers and surface chemistry of polymers. He has successfully blended his research interests with commercial realities and has contributed significantly to the Indian and global industry. He has over 200 publications in international journals and 70 patents and has guided 23 PhD and several M.Sc. students.

Dr. Sivaram has received several awards and honours including the Vasvik Award, FICCI Award in Physical Sciences and the Om Prakash Bhasin Awards for Science and Technology, the Millennium Medal of the Indian Science Congress Association and the Silver Medal of the Chemical Research Society of India.

He is a fellow of all the learned scientific societies in India, such as, the Indian Academy of Sciences, Bangalore; the Indian National Science Academy, New Delhi; the National Academy of Sciences, Allahabad and the Indian National Academy of Engineering, New Delhi. He is also a fellow of the Third World Academy of Sciences, Trieste, Italy and the Asia-Pacific Academy of Materials.

Dr. Sivaram has authored over 175 papers in peer reviewed journals. He has 75 patent applications to his credit, and has been cited as inventor in 35 US patents. In addition to doing research, Dr. Sivaram is also an excellent research organizer having developed a highly motivated and productive team of polymer scientists at NCL, collaborating with industry, both in India and abroad, as well as government bodies.

Dr. Sivaram serves on the editorial board of several international journals in polymer science. These include, Polymer International (Society of Chemical Industry, UK), International Journal of Polymeric Materials (Gordon & Breach, USA) and Designed Monomers and Polymers (VSP Publishers, The Netherlands). He serves as a Director on the Board of Asian Paints India Ltd. and Apcotex Lattices P. Ltd.

Dr. Sivaram took over as Director, NCL, Pune early this month, following the retirement of Dr. Paul Ratnasamy. In a brief interview with *Chemical Weekly* he muses about the past performance and future directions of NCL. *Excerpts from the interview:*

Dr. Sivaram, How would you sum up the 90's from NCL's standpoint?

I look at this 10 years in two periods: the first being 1900-95, and the second being 1995-2000/01. In 1990 we were confronted with a challenge, which happened to be coincidental with the economic crisis that the country was going through in terms of balance of payments, foreign exchange and economic factors.

These had its own impact on laboratories like ours. In the year 1991-92 a laboratory, which was being financed and funded exclusively by the government, in the 80s, found itself in a position where the resources were suddenly lacking.

I actually recall, in 1991-92, when Dr. Mashelkar was the Director of the laboratory, we had to even request MSEB to collect the payment for their bill on a deferred basis. This was the extent of the crisis that we faced, because we did not have money to pay our utilities bill. We requested the MSEB to reschedule the payment.

It dawned on many of us, including the then director Dr. Mashelkar, that if this lab has to survive we have to learn to bring in our own resources. At that time money was indeed a crucial factor. We felt and expressed the need to go back and get income to the laboratory from non-governmental sources.

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Industry being the key source we had to reach out to it.

That was not easy as the Indian industry was also going through a period of readjustment to a more liberalized economy. In fact, I remember Dr. Mashelkar in 1992 telling me and my colleague, Mr.R.R.Hirwani, to write a position paper on how NCL would cope in an economy that is opening up.

What about your strategy?

During this period bringing in resources into the lab was a key focus as it was vital for our survival, at least on a short-term basis. Many of us went aggressively out in order to bring in this money into the lab.

At that time, many of us, and especially Dr. Mashelkar, articulated at several public platforms that Indian laboratories can perform world class research and, therefore, organisations from outside India can come to do research in labs like NCL. He made his first such speech in 1992 in Patiala, where he predicted that India will emerge as a platform for global R&D.

This was the opening up of yet another window of opportunity. At least that is how I look at it. The time was opportune because at the same time across the globe many companies were downsizing their own internal operations. They felt that it was a better option to outsource their research operations to labs and universities that have the requisite skills.

This model of leveraging external R&D resource to grow the internal R&D of a corporate entity became important in the 1990s. The fall of the Berlin wall was to some extent extremely symbolic because the West started reaching into East Europe and Russia, and I think that they also started looking at India at that time.

Thus the five years, 1989-95, paved the way to the prosperity that Paul [Ratnasamy] has talked about in his description of the period 1995-01. These initiatives were taken because we were pushed into a corner and needed to survive. I believe that when pushed to the corner human beings survive and, generally, survive well.

Did your efforts pay off?

Yes, indeed. In fact when I came into this laboratory in 1989, most of the facilities had become obsolete.

We had to take a loan from ICICI/ World Bank for something close to Rs. 6 crore because there was no money available from the government to pay for refurbishment of research facilities.

We realised that if we don't do that we have no way of getting into industrial and contract research. These assignments come your way only when you have the right facilities at your disposal. Customers pay for the services, not for capital investments.

Taking a loan from ICICI was a major step. The credit for this significant decision goes to Dr. Mashelkar. At that time it was unheard for research laboratories to take a soft loan from international lending agencies.

It was a kind of deal — you give us a loan using which we create new facilities, which will, in turn, enhance our ability to do more research for Indus-tries. This will generate an income which will help pay back the loans. This decision was taken in 1992 and enabled us, within a short span of two years, to scrap every obsolete facility, especially in polymers, catalysts and to some extent in the area of organic process development, in terms of pilot plants and analytical equipments.

We have been repaying the principle and interest since 1995 from our own industry earnings. I feel that we have been able to fulfil all the commitments made to the lending agency.

We asked ourselves two key questions: Do we have any global opportunities to perform research? And if we do, then can we have the facilities up and running in the shortest possible time? The amount of Rs. 5 to 6 crore needed could not have been obtained from the government at that time and this where the loan from ICICI helped.

How were these initiatives translated into business in the second phase between 1995-01?

This was the pay back period. We had a steady flow of income from companies outside India and within India. Our extra-budgetary earnings steadily increased over the years. This additional income enabled us to add new R&D facilities.

The Division of Polymer Chemistry was a special beneficiary because we successfully negotiated in 1994 a major research contract with GE, USA. This relationship grew over the next seven years and ultimately led to a decision by GE to set up their own Corporate R&D centre in India at Bangalore.

We also have several research contracts with companies from the US and

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Europe. However, I wish to emphasize that this was not done at the cost of other activities at the lab. Even at its peak the resources generated from contract research with international companies was no more than 18% of our total budget. At the peak not more than 15 scientist man years were devoted to research with global companies.

What were the lessons learnt while doing business with global companies?

What happened in 1995 and beyond gave us two benefits. It taught us a new business model, and I am happy to say

"The risk of failure in research should never be a deterrent for a scientist"

we have been able to replicate this business model successfully with many Indian companies. The second benefit was that it taught us how to write contracts and patents.

We learnt how to negotiate with companies, which have immense legal clout-far superior to what a lab like NCL possesses.

We could sit across the table and talk and that gave us the confidence about being able to deal with these people. Most important is that we earned the credibility of these people as they spoke well of us. In most cases, barring very rare occasions, the customer satisfaction level has been, in my opinion, above average with global companies. Almost all of them speak highly of the value that we have been able to create to their research programmes.

Did this experience lead to better business prospects with Indian companies?

This has had a spill-over effect, in the sense that many Indian companies felt that if we could do it for international companies, we could do it for them. Clearly, our credibility with Indian companies improved.

In fact around 1997-98 we saw the re-emergence of Indian companies in terms of their thinking about growth. We could translate the learning from global companies to Indian companies. This was very important for us to do. We could analyse the cause and effect relationships in research, especially in the area of new product / process development in a more rational manner than previously.

What were the weak points within your system when it comes to deliverables?

We learnt how to define deliverables, which was, in my opinion, one of the weakest points of NCL. Way back when I came here, we used to write research contracts where deliverables were defined rather vaguely. Much of the problems that we ran into with Indian companies was because of such ambiguities.

One wrote one or two deliverables, but ignored a few others which were probably more important. When we worked with international companies we learnt that the time and effort spent on defining deliverables were important.

How did you bring in a sense of accountability in research projects?

One of the things that I have found out is that scientists by nature are unwilling to be tied down. The risk of failure in research should never be a deterrent for a scientist. He should recognize that when somebody is investing his money in research, he understands the finite risk of failure. In case this understanding is lacking in our customer then it is our job to enlighten him.

If you ask an average scientist to put in a commitment regarding the success failure in research, he shies away, with a "How do I know this will happen." In companies, when they undertake research, the goal is well defined. Whether you reach that goal or not depends on many factors. But the important thing is that the goal is defined upfront. We have realized this and have implemented the same in many contracts signed and successfully completed so far. This solves half the problem, but it takes quite a bit of learning. You have to quantify and put numbers when you specify deliverables. Qualitative descriptions of deliverables are Just not enough.

Yield or purity for a new process needs to be defined in terms of Rupees/kg or percentages. In many cases methods of measurement have to be defined along with the values desired. Generally when you ask your team to put numbers against deliverables they are hesitant. But, I say you have to. At the end of the project it is important for both the laboratory and the customer to know whether we have succeeded or not. There can be no ambiguities on this account. This can be assured only if you define your deliverables quantitatively and with utmost care. With most international contracts, you have to put numbers upfront and we are doing it. It has been a good learning experience for us working with these international companies.

What were the gains coming out of these global contracts?

We have improved a lot in terms of

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building a decent credibility over the years. We have aggressively pursued patents as a goal and this has helped us in earning the respect of our potential customers. We are recognized as a laboratory capable of innovation. We have learnt to negotiate and license IPR's to companies outside of India. We have been able to create world class research infrastructure at NCL.

How are you balancing your budgetary challenges now?

If we look at NCL's CSIR and non-CSIR budget share last year, it was 50-50. Out of the 50% of non-CSIR funding around 8% was from international companies and 12% came from Indian industry. This makes it 20% from industry sources. We get around 23% from the government. Since Dr. Mashelkar became DG-CSIR (for past five years) public funding into R&D has significantly increased. People don't realise this. The fact is substantial amount of money is coming from the government, not as a grant, but in other guises like CSIR Golden Jubilee Fund, New Millennium Initiative in Technology Leadership Project, etc.

The balance 7% comes from licensing fee, royalty, consultancy, etc., what we call as miscellaneous receipts. Compare this to 1995, when around 85% of funds used to come from foreign companies. The focus has definitely shifted now as you can see from our current figures.

We have also expanded our research portfolios with Indian Companies and are even working closely with them towards the objective of making strategic technology plans for the growth of the industry.

Have you thought of any specific model for interacting with Indian companies — more on a relationship basis than on a transactional basis?

In fact, we did it with Reliance in 1995 and now they are one of our largest customers. We are looking at more objectively, the nature of our interaction with Indian companies and whether we can become an integral part of their growth. This will give us new opportunities for R&D collaborations.

What will be your criteria while choosing such companies?

For the past few years we have tended to move away from purely transactional model of projects to more of a relationship model, especially with companies, which are large in size with multi-products and multi-locations.

Earlier, we used to enter into a contract for one or two years at the end of which the relationship terminated. Now, we endevour to build and sustain a relationship for more number of years, wherein, NCL becomes a part and parcel of that company. Some of these agreements are evergreen and have no sunset clause. This is what I call the relationship model. This, however, does not prevent us from entering into transactional model with small and medium sized companies with the limited objective of performing a project.

What are the limits of the transactional model?

I find that for large companies, which are multi-product, multi-location and multi skills, it is not wise to use the transactional model. It is indeed better to build a relationship model as it helps to build credibility and competencies over a large period of time. I tell my customers that if I know we will stay together for a long time than I can even build internal resources, bring in new skills into the laboratory and / or strengthen existing skills so that these resources and skills can support you.

How does all these this fit into developing research skill sets within your team?

Companies can hire people for specific jobs, but they find it difficult to sustain a broad range of skills. A publicly funded research organization like NCL can become a host for a diverse range of skills and competencies, which, in turn, can support the R&D in industry. With increasing sophistication in R&D in industry, NCL will have to create a unique space for itself. We have to differentiate ourselves from the research and technology competencies existing with our customers. It is my view that laboratories like ours should build and sustain knowledge based competencies in frontier areas of science. This is something industry will find difficult to do in our environment. Such competencies can leverage industrial R&D effectively.

I believe that areas like rheology of complex fluids, computational science, molecular modelling, process modelling and simulation, quantitative understanding of structure-property relationships in materials require a high degree of fundamental science and yet are very useful to industry. Within the framework of a relationship model, I will be prepared to even create specific skills at NCL and sustain them, if I know that such skills and competencies could be of use to the industry.

"We have to, in my opinion, establish an Internal Performance Appraisal Board and I intend to establish some system for it"

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What kind of forays are you planning and where will you get your people from?

We need to look at new opportunities. We must have the wisdom to change and new vistas to chase. Research and technology being unpredictable, we cannot claim to fully know the shape of things to come. All that we can do is to build specific skill groups in this laboratory which we feel are contemporary and which will address the needs of the future. I shall be looking at ways to develop such skill groups from our existing talent, and hire new skills if we lack them. The skill groups we are looking at include, new molecular and nano-materials, chemistry inspired biology and biology inspired chemistry, Chemical theory, computational science, innovative process chemistry for organic chemicals, etc. We intend to identify more such relevant skill groups through an informed debate within NCL. We have to also pay attention to improving our R&D productivity and efficiencies.

My strategies for the future are:

- To identify those areas in research and technology where there is a low entry barrier. It is necessary to avoid competing with people who have substantially larger resources than we have. We should be focused on new ideas and innovations.
- To focus on materials and chemicals which are single vendor items globally. Many of these materials are also not defined by molecular structure, but only by performance (example, formulated products). There is a greater incentive to commercialize such products because the competition is likely to be small.
- To focus on materials whose transportation cost are higher. Indian manufacturers of such products are effectively insulated from the threat of competition by imports.
- Similarly there are many technologies which are highly proprietary and are difficult to source. We need to create an inventory of such technologies and explore it's relevance to India.

How do you identify your strengths and weaknesses?

We do know what our strengths and weaknesses are. We also have a reasonable idea of where we stand in relation to international companies in terms of the quality of our scientific staff, our R&D infrastructure and our research processes. We know where we can bargain and where we cannot in terms of research services. We also know where we can be effective as a research partner and where we cannot be.

Does benchmarking research practices and internal research auditing find any place in your future scheme of initiatives?

Yes, they do. I feel that it is very necessary to carry out internal audit of performance. We have not done so in the past, but this is one of the things that I intend to implement during my tenure as Director.

CSIR has now constituted a Performance Appraisal Board (PAB) and this is an external body which goes around the laboratories and judges their performance. We need to also have a process of internal appraisal of performance within the laboratory.

I am thinking of a system where a group of scientists will review our internal performance, research areawise and identify those areas where we are doing well and where we are not doing well. What I intend to do is basically form a peer group within the lab and let them look at the performance of the lab, i.e. oversee and evaluate ourselves.

Any plans of seeking ISO certification for NCL?

I do not think NCL needs to go for a ISO certification. We may have a need for GMP/GLC accredition.

How are you faring on the human resources front?

In my view we have done reasonably well in attracting new talent. We posses scientific talent of a very high order. Leadership levels in our labs are high — in terms of second and third level leadership. However, we need to do more in the years to come. NCL will have to be marketed as a place where high scientific skills are nurtured and grown. We need to move aggressively to position NCL as a place where high quality science is done, but directed towards a goal and purpose. We need to make our research processes less bureaucratic so that new entrants do not feel the weight of the system bearing them down. We need to build an informal collegiate culture with a high degree of freedom to scientists, freedom from paper work and hierarchy.

How do you look at the future?

As a Director I am more concerned with the future than the present. Science and industry are changing rapidly. I expect that new demands will be made on us in the next ten years. The skills and competencies that have sustained us in the last one decade may not sustain us in the future. We have to constantly reevaluate our research and business models and ensure that they are current and contemporary. We hope to define a road map for NCL in terms of research and business areas and define the enabling skills and competencies which are needed to reach our destination. We shall align all our physical, human and financial resources to this road map. We hope to be more focused on our customers and ensure that we deliver what we promise to them. I believe that they are our most valuable assets. We shall do everything to see that our customers succeed, because, when they win we also win.

' • R. RAJAGOPAL