

## Biosys on the collaborative drug discovery route

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*Jubilant Biosys matures into a drug discovery services company, leveraging its roots in bioinformatics.*

In November 2006, Union Minister for Science and Technology Kapil Sibal inaugurated Jubilant Organosys Ltd's integrated drug discovery services facility in Bangalore. According to Jubilant Organosys' chairman and managing director Shyam S Bhartia, this center is the first of its kind facility and engages with Indian and global academia and pharmaceutical firms to make innovative drugs.

The scale of operations of this center is mind boggling. It is spread over an area of approximately 125,000 sq. ft, and houses over 500 scientists specializing in multiple disciplines including biology, chemistry, structural biology, pharmacology, molecular modeling, crystallography, and information technology. The center was set up at an estimated cost of Rs 70 crore.

The flag bearer of this center is Jubilant Biosys. It maybe noted that Jubilant Organosys Ltd has three subsidiary companies in India-Jubilant Biosys Ltd for discovery informatics and drug discovery services, Jubilant Chemsys Ltd for functional chemistry and Clinsys India Ltd for clinical research and bio availability and bio equivalence studies.

What is amazing is that this center and Biosys is being built on the strength of its informatics platform. Jubilant Biosys operates in the front end of the drug discovery and development chain. This business was conceptualized about five years ago by Dr VN Balaji, an exceptional computational scientist, and the company's co-chairman and managing director Hari S

Bhartia. The concept was to create a discovery services engine. "We focused on developing the business model that we call 'thrive on generating IP versus pure services'," said Sri Mosur, CEO, Jubilant Biosys Ltd.

In the early years, Biosys was doing content creation and analysis. Its scientists were organizing the research knowledge as relevant information for drug researchers. It was developing databases, like for instance PathArt, which had information about metabolic pathways. However, its focus was very clear. It never wanted to become a product company and made these tools to offer them as drug discovery assets. Biosys was laying strong foundations to become a complete drug discovery services company through its computational capabilities.

It started with where it could penetrate the market faster like in the content business, analysis business, etc. That is the curve that one goes through before understanding the market place. It added new capabilities setting up biology, medicinal chemistry, pharmacology and other divisions and managed to bring several experienced scientists from the US and other Indian companies to head its divisions.

The Center today focuses on collaborative development of novel molecules of interest that have potential therapeutic use to treat diseases in the areas of cancer, metabolic disorders (diabetes, obesity, cardio vascular diseases), tuberculosis and HIV. The discovery research includes design of modulators for specific sub-class of kinases, proteases and G-Protein coupled receptor targets.

So how does Biosys differentiate with other companies in India? It is very difficult to always state a good answer. "I always think that we pioneered either a business model or science and technology. And after that it has to be growth. It is the scale that matters, volumes will disappear," said Mosur. It is clear that Jubilant, in the discovery area, wishes to be the largest company in the region in terms of the scale. "We don't have to be a pharmaceutical company but be as good as the pharma company. This is not in the commercial arena but in the R&D space," tells Mosur.

### **"We are an absolute mirror of a pharmaceutical company,"**

**Sri Mosur, CEO, Jubilant Biosys Ltd**

*A chemical engineer, Mosur has over 18 years of experience in pharmaceutical manufacturing and outsourcing. Majority of this has been in managing sourcing and procurement strategy for pharmaceutical R&D and manufacturing projects from South Asia and South East Asia. Mosur has been instrumental in putting together a strong team at Biosys. He shares with BioSpectrum, ambitions and strategies of Jubilant Biosys.*

#### **What makes Jubilant Biosys so exciting?**

Jubilant Organosys has been a chemical manufacturing company for a couple of decades. Early this decade, we started moving more towards the value addition part of our business. So we looked at two core aspects. One is the value addition in the front end of the business, i.e., discovery and the development chain. The other aspect was the back end of business, which is the manufacturing business.

We were integrated from a manufacturing perspective and could do anything in small molecules from a few grams to hundreds of tons, be it any commercial or clinical supplies to any markets. We have facilities in the US and Belgium, which can do formulation or dosage form development. That end of business is very integrated. That is a critical component of the operation process of drug development. We created more value add through partnerships as well as capabilities.

Jubilant Biosys operates in the front end of the business. The front end of the business was conceptualized close to five years ago. Dr Balaji was the cofounder along with Dr Hari Bhartia, who is the cochairman of Jubilant. And the concept was to create a discovery services engine. We leveraged the IT platform and the domain knowledge in informatics. Dr Balaji had helped build Monsanto's informatics center here very early on. All these contributed us to focus on developing the business model that we call "thrive on generating IP versus pure services".

So Biosys started with informatics. And we have now integrated informatics into three different areas-chemoinformatics, bioinformatics, and clinical informatics. We added clinical informatics last year. We focused earlier on content because that was the only thing that companies would be allowed to do in the market space given the intellectual property issues in India. Also it was important to get the content analysis and content creation very effectively in the informatics space, while we were developing some computational tools like molecular modeling. This is one of our core strengths and we have over 30 people working in this arena. We were basically involved in rational drug design as a process and am not sure if that scale is available anywhere. There are three or four people generally available for cheminformatics and things like that.

We not only do a whole lot of integration but also develop tools that become valuable in the approach to drug design. That is called the insilico approach. So that was the platform that we started on. We were building the computational science capabilities by partnering with certain core groups like Schrodinger. We developed a lot of in-house capabilities and technologies around that. This is something that we never sold as a product. We focused purely on developing a platform to offer collaborative drug discovery assets. We never did focus on selling the tools, but on selling or licensing the content for revenue generation. So a lot of companies knew us for our informatics content creation, but we were also simultaneously creating a lot of core value for our insilico modeling approach.

### What are some of your differentiators?

Jubilant Organosys has a 67 percent stake in Biosys and the rest is held by members of the board and some employees of the company. That was a pioneering concept as employees were given stock options very early. While we were generating some sustainable revenue, we were also investing on developing core platform technology. It is not something that we would like to productize, but apply it to the next course of our strategy, which was primarily to become a collaborator for drug discovery. We had to add the pieces, if we have to create assets.

If you look at the entire CRO or Pharma space, the starting points are typically outside. My differentiator is that the starting point itself is inside. For example, Lilly has a deal with Jubilant and also with Nicholas Piramal. We generate the concept to the starting point, while companies like Nicholas Piramal pick up from the starting point like a preclinical candidate and develop it. Each one has a different model, which is good. Our foundation is that we will start early and then add to the entire value stream. We have complete capabilities for small molecules in our Organosys group. We are an integrated and virtual team that works between Biosys and Organosys. And Organosys makes sure that all those are lined up according to our expectations. People find us extremely integrated and transparent to deal with.

### So how did all this transform from an informatics platform?

While we were developing the platform and the content, we started putting the other pieces together. If you look at the chemistry service space, Organosys could have set up groups like the synthesis and FTE services, but we chose not to do that as we did not want to replicate an absolutely replicable business. We would not have done any value addition to the group. So we decided to focus on a new dimension-medicinal chemistry and related services. Medicinal chemistry is different from pure organic chemistry. We hired people at the top level, who were medicinal chemists. Medicinal chemists are not easily available in India, so we hired a pool of organic chemists and started to train them to think like medicinal chemists. We have spent a lot of time and money in this area just to build a module. I am happy to say that we are moving towards a 350 member set-up by March. We are already 210 in the last two years. And the good news about that is our relationships are more focused on value added hit-to-lead work and early stage medicinal design chemistry. We were able to bring the value to ourselves, which complements our entire strategy in Biosys.

We have a 76 member medicinal chemistry group and this team focuses on how to work with computational group in designing the best chemistry space as possible-designing, synthesizing, iteration etc. The medicinal chemistry and computational science were our drivers. But for good drug discovery platform you need to have extensive validation of biology. And we focused on building a biology engine from that perspective latter. We concentrated on the gene target family as focus area to grow. We set up an integrated biology group. But we approached it from two perspectives. Drug discovery is based on knowledge, technologies and exceedingly good validation procedures. All these pieces are important. We have computational science as insilico platform. We created a core competence in structured biology-which is protein crystallography. Protein crystallography is a huge enabler. Now we have created a full-fledged engine, including a DMPK facility. So in biology we are not just in vitro. We have a very strong platform in cell biology. We built the entire platform in about 18 months.

What we did was to move away from a pure services alternative to a collaborative drug discovery alternative. We have a clinical development arm in Clinsys. So our engine is complete. We can do anything internally up to preclinical all out of

original concepts or collaborative original concepts and from preclinical we can take anything up to Phase-II. Our partnering models are also clearly defined. One part is collaborative research and the other is development. We are an absolute mirror of a pharmaceutical company and our objective is to create that kind of an opportunity and scale for the pharma companies. They should not look at us as a functional piece but come to us for original ideas through the entire space or start anywhere in the space with their ideas and bring it to conclusion.

### How have you managed to generate revenues?

Even before we built Biosys, as it is today, we had the commitment from relationships like with Eli Lilly. So business was there and we appreciate partnerships. We were lucky to start with an established business and our objective is to build on that and to scale it. The concept is already in motion and now we need to leverage on the same. We have some exceedingly good responses. We are already engaged in five-six programs, which are purely end-to-end discovery collaborations-target validation to the entire chain. We deliver up to what ever is mutually agreeable. If it is early-stage collaboration, it will be a lead; if it is a latter early stage collaboration, it could be a candidate; and it can also be a proof of concept. So we got all these three models. We are doing all these for the last one-and-a-half years while we were building our facilities and capabilities. We started them in the hope that we will reach each phase by the time we get ready. For example by the time our animal facility will be ready, we are getting into our first lead optimization transfer of an original concept. It took as 12 months to get there. So business exists as our concept has been well sold and received by our partners. We have about 38 collaborations between chemistry, structured biology, and informatics. Some of them are functional outsourcing, while some are more elaborative programs. On a collective scale, Biosys has close to 525 people. We kept the chemistry arm separate through Chemsys and it has about 230 people. About 75 percent of our programs are without a starting point and 25 percent are from the starting. Eventually, this ratio will be 50:50.

Ch. Srinivas Rao