

Infosys Technologies Limited  
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**Session 2 by Subu Goparaju**

Good morning to all. Thanks for being here. My name is Subu Goparaju. I head the Software Engineering and Technology Labs. Software Engineering and Technology Labs or SETLabs is the corporate technology research group at Infosys. We were started in year 2000. The mandate for us is to look at emerging technology continuously and identify ways of exploiting those technologies for business benefit and business benefit both for Infosys in how we do our engineering faster, better, cheaper or improve our engineering productivity or bring down the cost of developing our services or helping our clients in improving their competitiveness, how can we leverage technologies and advise clients on how they can exploit these technologies for their businesses. So like I said, the aim really is to look at emerging technologies continuously and identify ways of leveraging them and the model we follow in Infosys is innovation management model. It really has these six stages. It is really about identifying emerging technologies that are of importance to a business and among those technologies, selecting the technologies that you want to invest in that you want to play in and then create intellectual property, create capabilities, create solutions and take advantage of and the third stage is really after selecting the technology that you want to invest in, creating like I said, intellectual property and capabilities. Fourth one, having created the intellectual property and solutions, how do you protect those things and after protecting the real thing is how do you exploit, that is how do you make money on the investments that you have made. So some of those stages are SETLabs intensive, some of those we work along with the business units. For example specifically around exploitation specifically taking advantage of, we work with business units which we evangelize their intellectual property that we create to the business units and through business units which to the clients. So this is the innovation management model and like I said, the mandate really is to look at emerging technologies and what we really do is, how do we exploit those technologies by creating various kinds of methodologies, tools and solutions that help us in our internal engineering which is really about bringing the cost of engineering down or helping our clients in their competitiveness though helping our business units create solutions that they can take to market. The third dimension really is in the early stage of research, we create several points of views on how technologies can be leveraged. So that is really the thought leadership aspect of that.

So given that is our focus really and what is the vision or theme that drives our research. Every research group has a vision or theme that drives the research and we define the theme or vision that drives our research as Agile IT which is really about how do we help our clients in building a very agile IT architecture in their businesses. Why is this very important? Yesterday you all heard Nandan talk about the flat world transformation where lot of things are changing around you. What is being made is changing, where it is being made is changing, where you are servicing it from is changing. So obviously every business wants to exploit those kinds of changes and take advantages of those opportunities. Now given that we are living in an IT based automation era. if you want your business to be very agile, if you want your business to be very responsive, then the underlying IT architecture needs to be very responsive. There have been any number of examples where businesses were not able to take advantages of those opportunities because their IT architectures were not flexible enough. So everybody knows that there IT architecture needs to be very flexible. But how do you do that and we believe that we have the right prescriptions for that and we believe that there are five levers that people or business can manage in order to make their IT architectures very agile or flexible and we define them. First one is dynamic processes, that is given that a business is really its business processes, how do you ensure that as and when you need, how do you change your business processes, how do you define them, how do you manage them, how do you measure them, how do govern them etc etc. So that defines the first dimension or first lever that we talk about under dynamic processes. The second one is given that a business processes is really running on an IT architecture and there are so many technology advancements that are happening, how do seamlessly absorb all those changes for your business benefit without having to greatly change your IT architecture or without having to let go your previous investments. So that is possible when your IT architecture is really malleable. So how do you make your IT architecture malleable is the second dimension. The third one is what we call pervasive infrastructure. Given that this computing is getting embedded into more and more aspects of the business, mobile devices, RFID etc etc. So how do you manage your all pervasive infrastructure is the third dimension. This pervasive infrastructure, this dynamic business process which is running on a very malleable architecture, the purpose is really to ensure that all the stake holders in the business get their decision making capability by getting the information they want and that is the fourth dimension. How do give personalized information to all the stake holders. The fifth one is what we call

transformational IT management which is really about managing all these first four levers in a very dynamic way. Things like IT governance, RY analysis etc etc. So those are the fine key themes of agile IT.

This really is a 10,000 feet view. So each of these things actually drives down research in several areas. I will leave it for you to take a look at that for a minute. For example if you look at dynamic processors, we do work in business process management, intelligent systems, enterprise collaboration, knowledge engineering etc. And so each of those five things has various focus areas underneath them plus specific work in certain technology platforms. Everything supported by an underlying software engineering research. And the focus of software engineering research is really to increase our productivity on a continuous basis and make the systems very reliable.

So I will talk about some of these things. The research applied research in each of these things actually comes out like I talked earlier has either tools or methodologies or frameworks and I will talk about some of those things as we proceed. So what we have produced? I talked about our innovation management model where we constantly identify technologies of importance, select the technologies we want to work in, create intellectual property, protect the intellectual property and finally exploit. So that is really the model. So we do a lot of applied research. We develop lot of tools, frameworks, methodologies etc and then finally we evangelize them deploy them in IBUs and through our business units, we take them to our clients. So consulting is a key component of our deployment strategy where the SETLabs researchers and product developers and consultants actually work with projects and not only that. We actually do a lot of training and certification to the business unit because doing everything through consulting is not a scalable model. We do not have enough people to have to participate in all of the projects. So we do lot of training also. Overtime over 50 IP assets which take the form of like I said methodologies and solutions and tools and frameworks etc. Our patenting activity started over the last year and a half or two years and we have filed about 38 to 40 patents now and about 20 to 25 are being considered. These numbers that I am giving are only SETLabs numbers. The overall Infosys numbers will be slightly higher because there is lot of stuff that happens in the business units also and SET Labs also has the responsibility to identify that intellectual property that exists in business units, that gets created in business units that gets created in business units and we actually protect those. The publications is really about the thought leadership dimension, the third that you have seen in the previous slide. It is really about creating points of views in how technology can be exploited etc. So we have our 200 technical research papers, research notes, white papers, case studies etc.

This is a list of various offerings or various solutions and frameworks that we have created. I will talk about some of those things in a little detail focusing mostly on what they are and what is the impact they have produced for Infosys. So having identified and selected the technologies that we want to work in and having created the intellectual property. This gives us a snap shot of how various offerings have been used in our business units in various kinds of projects. That is the data for the last year and the next one shows how we actually do lot of training and evangelizing and enabling of people. So that they are trained on the intellectual property and they can actually do themselves in IBUs. So these are the numbers for the quarter and the enabling that has happened around various kinds of offerings and IT.

Now this is enabling. These are number of sessions we have done for internal enabling. The previous slide is the one where the number of projects the IT has been used. So this is deployment and this is enabling of the organization to enable the deployment. Right? So when it comes to exploitation, there are two kinds of deployment that are necessary. One is internal evangelization so that our business units are enabled on those and finally the purpose is really to take them to our clients. So as far as the client evangelizing is concerned, we have defined a program called Co-creation workshops. Co-creation is a concept developed by Prof. Venkataramaswamy of Michigan Business School and he is the collaborator and we are working with him. And we are actually using that concept at two levels. One is it is a solution offering where we work with clients to help them implement the co-creation process. I will not go into the details of that but we have used that model to actually create a workshop to make our clients partners in defining the research agenda that we drive. So first we work with our clients and define a research agenda, next we collaborate, the SETLabs researchers work with the architect of our clients. There is a collaborative team that is formed and then we co-create intellectual property. Though we call it co-create, the understanding is that the intellectual property entirely belongs to us. The advantage for the client is he is able to influence a group like SETLabs which has more than 300 researchers, take up a research agenda that has direct benefit for him. The benefit for us is, when we work on something we know that there is an opportunity to actually leverage that in a business. So we have defined this model and over the last couple of months, actually we started it in May. We did 4 days of these innovation workshops. These innovation workshops have been very good success. And in almost all the workshops all most all the clients, we have actually come back with lot of interest from the client side where we have either identified opportunities to deploy our current IP that is already existing, the mature variety intellectual property or we have identified new pieces where we have

defined projects to do proof of concept and things like that. So this is really about how do we take our IP to the clients.

So far we have talked about what we are working on, what is the model, how do we identify select, create, protect and explore it. Now I will take a few examples of some of the solutions and frameworks we have created and what they have done for Infosys. The first one I will talk about is Catalytic IT, which is really a manifestation of agile IT thing I talked about on Microsoft platform. We built it for about a year or so. It has four major broad areas of engagement. One is legacy, modernization, infrastructure optimizations, helping them connect systems and finally package consolidation. So over the last one year, we have been taking to market and in our model, we have a IBU collaboration model where one of the business units actually sponsors in the early stages of developing any large solution and they responsibility to take that to market and for this one, our Systems Integration practice is the sponsor, they take to market and over the last one year we are currently doing about nine engagements with our \$ 12 million revenue. What you are seeing there is the realized one but the actual value of the engagements when they get over will be larger than that. We have a very strong pipeline and there is a very good acceptance for this in the client community.

Second one I will talk about is InFlux. InFlux is really a business IT alignment methodology. The background for this is, I am sure all of you know that in most IT projects, one of the biggest issues is the requirement not being translated into the IT solutions effectively. So that is the problem InFlux tries to address and we believe that in large transformational projects, first of all you should always start at a business process level and two it should be the business people who should define the requirements of the new systems that is required. What we here do is we have actually created a methodology where business users can use a methodology and define the new business process requirement and have created automated ways of translating those business processes requirement into IT architecture models and finally an IT solutions blue printing. One key advantage here is, upfront we take into account what we call the quality of service factors, what should be the performance level, what should be the responsiveness, how many people will be using, how will it scale etc etc. So that when the system is developed, there are no surprises from a functionality point of view and there are no surprises from a quality of service point of view. So the InFlux has been around for sometime and it continuously keeps getting evolved and last year itself we have used in more than 100 projects and for the last couple of years, we have actually started licensing the methodology to our clients because most of our clients show an interest to use them enterprise wide and we have started signing enterprise wide license agreements. 16 are already done, we are looking at another 10 or so.

Other one I will talk about is Radien. Radien is a JAVA J2E development framework. Here again the issue that most projects face is, if you have to develop everything from scratch. The biggest challenge is really making sure that you are developing it right first time. Here again there have been any number of examples where people have spent a year, year and a half building something and may be another year or year and a half trying to make those things work and even we had issues like that years ago. So Radien tries to address that issue for J2E based projects. So a lot of technology infrastructure kinds of things are already built into this framework. So any J2E projects can actually start on this framework and entirely focus on the functionality, the business functionality they need. It greatly helps us in improving the productivity because it really helps us do things right first time and most importantly lot of quality of service problems are taken out. Once you build the system, you are no longer wasting your time in trying to improve the responsiveness. There have been examples where when things are not done right first time, the client wanted responsiveness of 3 seconds and your system is returning after 15 minutes. You can never improve from 15 minutes to 3 seconds by finetune. So you need to design those things upfront and build for those requirements. So here again, Radien is a huge success. Most of the clients who have seen this have deployed those things and it is a clear differentiator and last year alone we have deployed it in more than 300 projects. Here again we are licensing it. Clients do show interest to deploy it enterprise wide and we are signing licensing agreements. So far we have done 16 and we are looking at more.

The fourth one I will talk about is IPSP. IPSP is Intelligent Production Support Platform. This is one of the solutions but the underlying technology is what is called knowledge engineering. We are in knowledge-based industry. Most of the things we do are very knowledge intensive and knowledge itself is very people dependent. So an expert in a system can solve the problem lot faster than somebody who is not an expert in that or who is new to the system. So the key aspect of knowledge engineering is - is it really possible to codify some of this knowledge and make it into a system and make the system help you or help a inexperienced user to do the job better? We have built the underlying technologies of knowledge engineering, ontology, etc and we have one of the first applications where we have used the concept for is the production support in a maintenance environment and what we have really seen is a) it helps the same expert user to do his job faster than what he was doing to it b) it actually reduced the requirement of an expert user in more than 50-60% of the cases. We are actually able to replace an expert user with an inexperienced person and make the system help him do the job. Three, it actually

helped us reduce the training requirement. So this again is a huge sector. Everywhere we have shown IPSP, the clients are very interested. It is actually being included in our maintenance offerings and being rolled out. But like I said, for production support use, one of the applications where we have used this concept but the underlying platform of codifying knowledge and then make it help you back is the core concept and that is something we can advantage of in many different kind of applications and that platform we are actually using to build more such applications.

The last one I will talk about is mConnect which is an infrastructure to help businesses mobile enable their enterprise applications either in internet applications or network applications whatever. It is not a new a concept. People have tried that but the key thing is lot of business which have tried in the early stages of the mobility evaluation, a lot of those things failed and lot of businesses have kind of concluded, at least the clients we have seen have concluded that we tried that, it does not work, there are lot of issues, may it is not the time to look at. So we are actually talking to lot of those people and we are telling them, yes we know that you have tried this stuff but you have probably failed but lot of things have evolved. The infrastructure has evolved and we talk about the key problems they have faced and we show them the intellectually property that we have that actually helps them address those issues, whether it is fall factor kind of things, whether it is speed whatever or having to program many difference devices. So we have IP that actually eliminates a lot of those problems and I talked about the roadshows we did in last quarter. This is one thing that generated a lot of interest and we are actually currently doing 12 proof of concepts for various clients and lot of those things actually came from the roadshow that I talked about. Because this is one thing which is common across all the clients that showed interest. This is really what I wanted to talk about our model and the intellectual property we create and how we take advantage of that for Infosys business. So that brings me to the end of my presentation. If there are any questions we will take.

### Participant

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### Subu

Can you please speak into the mike. That is being recorded?

### Participant

\_\_\_\_\_ first manage and we measure your productivity generally. And two is, are there any obvious also misses also that you have all had.

### Subu

Obvious?

### Participant

Misses. You may have not gone down a particular path when you did your visioning and you miss the target and any learnings to share from that.

### Subu

Okay when you say productivity, are you referring to how these impact Infosys productivity or our own SETLabs productivity

### Participant

You said you published let us say 55 papers. But is 55 a good number. Should it have been 100 or \_\_\_\_\_ where \_\_\_\_\_.

### Subu

Okay, we constantly benchmark ourselves. We have a list of organizations that we look at. This is a combination of businesses. Businesses that have been in some kind of industrial research for many years but of course they are large bigger organizations and we kind of try to learn a lot of things from them. We look at academic institutes, so mainly those. So we have a list of 10-12 people that we constantly watch and benchmark against. #1. #2, the

publications. We have a very strict guideline. At least 60-70%, I would 70% of the publications are in what we call peer-reviewed journals because publications in those is tougher and it is not that we do not allow online publications but we do not measure them the same way that we do peer-reviewed journals. So far we have more than 200 technical research papers and the number every year constantly has been going up and like every other business we take goals on those things, the numbers of papers that we will try to publish and things like that. So if we really measure with the list of people that I talked about, our numbers definitely are favorable and we are doing probably better than most of those people for the size versus the number. So usually in things like this, usual benchmarks that people will use is about one and half to two papers in peer-reviewed journals in a year. We are probably doing much more than that.

### Participant

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### Subu

Can you speak into the mike?

### Participant

How this gets translated into the time cost effort value matrix. See from a client prospective, whatever research you do, whatever papers you publish, the thought leadership that has to get translated and measured at the user end. So what does the user get from a time cost effort value. So what is the time taken for me to do this cost, what is effort required? If I use this IP, this platform, this methodology, how is it better? Can you translate that? One paper if you give, one important paper which has been chosen into a project. You said you have licensed 16 of the InFlux. So what does that mean at the client end and your client as an Infosys end or is it an external client?

### Subu

Yeah, That is what I talked about, but anyway. See first of all thought leadership, the publications we do, the purpose of those things is not really to create a revenue impact as soon as it is created. It is a really a point of view. It is in the early stages of research. Let me just go to that slide 1.

### Participant

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### Subu

No, no, I will talk about that. I will talk about that. See if you look at the slide, the thought leadership dimension is in the early stages of research when the work has not translated into either a methodology for internal engineering effectiveness or helping a business unit come up with a business solution. So in whatever area we work, we will never continue only in this dimension. If it is only that, then they are not serving any purpose. We are not an academic institute. So the final goal in any focused area is either internal engineering improvement or improving client competitiveness. So we measure those aspects only at those dimensions. The thought leadership dimension is really about improving the Infosys perception of what Infosys technology can do. That is really the purpose and other purpose is to also and that perception is not only with clients, the perception is required with for example the people we want to collaborate with, because we need to work with lot of professors and other research institutes and the way they will decide whether they want to work with us or not based on this. So each of these things has a different purpose. That is about improving internal engineering effectiveness, this is about client competitiveness and this is about improving Infosys perception with clients as well as the collaborators that we want to work. So coming to what is the impact that it is producing, we will really look at only those two dimensions and it is clearly about it helps us differentiate, it helps us win projects and it helps in our premium pricing and that is how it is measured.

### Participant

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**Subu**

I will probably take the last question because I think we started late but we are running late. You also need to have a break and move to the next one. We have already I think used up your break time.

**Participant**

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**Subu**

We have today 350 people and they broadly fit into three rolls. First there are researchers, then there are the development teams and finally consultants who evangelize, deploy and work with projects as consultant and background is about 8-10% of them are PHDs and the rest of the people, about 55-60% would be with a bachelors background, rest would be masters and even these bachelors people, we kind of go to IITs and places like that and we only speak to computer science folks and recruit them as junior researchers. Of course that junior researchers selection is a very tough one because sometimes we get about six to ten people, sometimes we do not get any. In addition, we also have the normal Infosys software engineers who are selected a little separately and it is like we choose them and they also choose us. So that is really the background.

Thank you very much