CUBE LIFE

FROM OTTAWA WINTER TO TROPICAL PARADISE

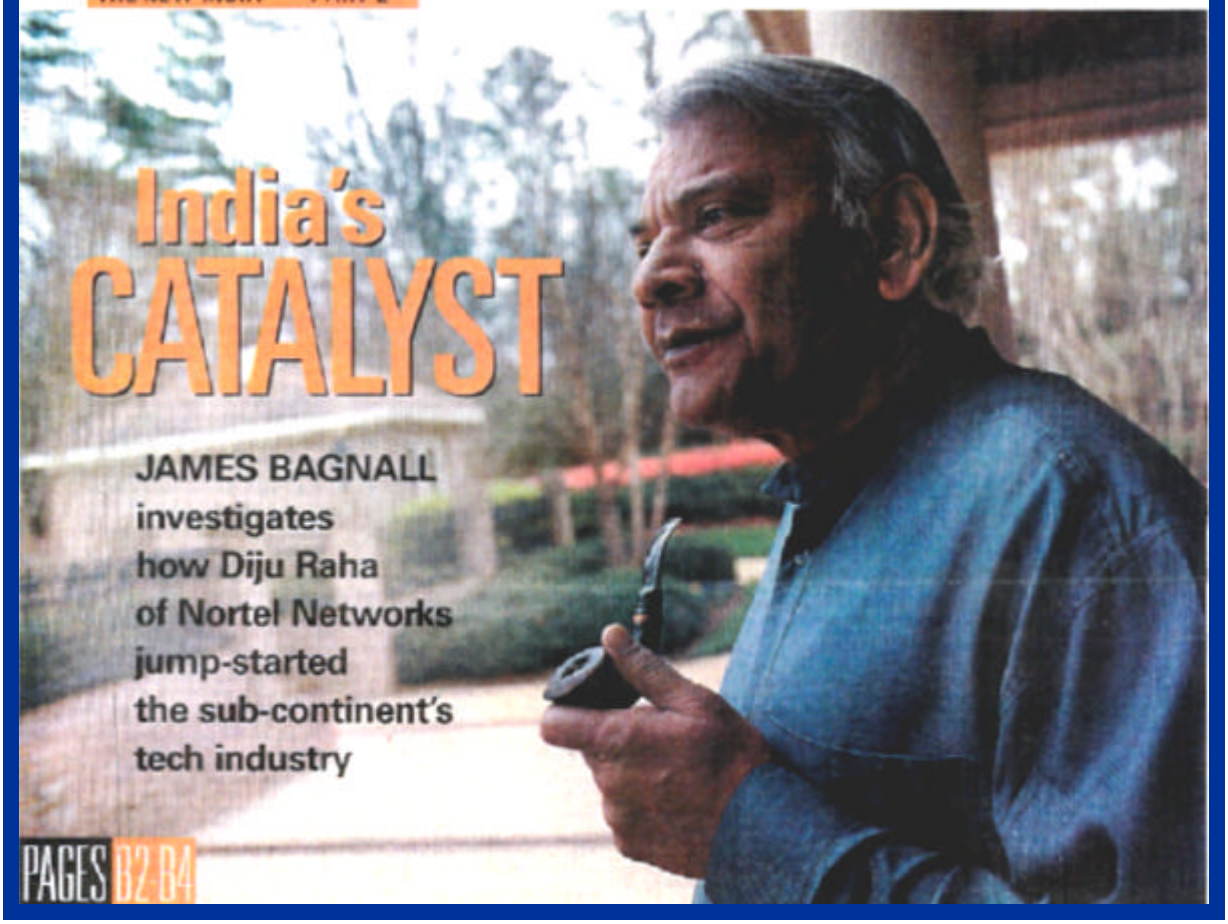
PAGE D10

CYBERIA

'WILD MAN' MELLOWS INTO FAMILY MAN D9
BARBS AND BOUQUETS FOR NORTEL D11
KATHI WARNS: 'DON'T GO THERE' D12

techweekly

THE NEW INDIA — PART 2



India's CATALYST

JAMES BAGNALL investigates how Diju Raha of Nortel Networks jump-started the sub-continent's tech industry

PAGES B2-B4

EXIMsoft

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The New India

Nortel began by giving Indian programmers routine assignments. Now, those programmers are asking for work that involves leading-edge technology

James Bagnall
The Ottawa Citizen

Gary Allen for Techweekly/Ottawa Citizen
In the late 1980s and early '90s, Diju Raha was a Nortel VP when he first contemplated using Indian programmers to complement North American research and development projects. At first blush, Indian facilities weren't very impressive, but he could see that key personnel 'were world class.'

In only a decade, India's tech industry has gone from one of the globe's weakest players ….to one of its more promising. Nortel Networks had a surprisingly big hand in the transformation.

MUMBAI, India - a warm morning in early February, several thousand of India's tech luminaries and wannabes gathered at the Oberoi Towers, one of the priciest hotels in south Mumbai.

They were part of their country's intelligentsia, schooled in top colleges from Bangalore to Boston. Many had worked in North America and Europe for foreign firms or while on assignment with India-based companies. Now they were renewing acquaintances, nailing down contracts and negotiating alliances.

The group mingled casually in conservative, western-style dress and air-conditioned comfort, oblivious to the heat, noise and pollution building up along the city's once-magnificent Marine Drive.

The occasion was Nasscom 2001, India's largest software conference, which encourages talk about venture financings, hiring issues and

technology trends. But this year, there was also a more serious matter to consider.

A recession was looming in the U.S., the high-tech superpower that buys 60 per cent of India's software exports. The slowdown there was threatening one of the sub-continent's healthiest industries. Exports of India's software services had surged to $6.2 billion U.S. in 2000 compared to just $735 million U.S. five years earlier.

Sanjay Chetty Naidu for Techweekly / **About 450 Infosys programmers are dedicated to Nortel accounts. The Indian tech firm's modern head-quarters in Bangalore.**

Indian software firms were now an indispensable part of North America's high-tech industry. Armed with high-speed data links to the U.S. and Canada, they looked after many tedious but essential jobs such as maintaining and upgrading millions of lines of computer code and adapting software for use in different countries. The question was, would their role remain secure in the face of a U.S. slowdown?

A special panel convened to consider the matter. Of the six panelists, only Jason Pontin, the visiting editor of Red Herring, a presitigious U.S. tech magazine, felt Indian programmers would suffer. Others were convinced the industry's trends still favoured the sub-continent with its huge pool of inexpensive technical talent. "India's software industry is the most nimble in the world," said Alfred Elbrick, an executive with DB Alex Brown. "And more and more companies are outsourcing their software maintenance and upgrading."

Nasscom president Dewang Mehta offered an even brighter assessment. Not only would India win more outsourcing contracts, he said, but its industry titans would diversify rapidly into other niches and countries. He concluded India was still on track towards reaching $50 billion U.S. in technology exports by 2008 -- the figure suggested in a recent analysis by U.S. consulting firm McKinsey & Co. Mehta predicted that within seven years India would have nearly a dozen multinationals, each with revenues of more than $2 billion U.S.

It was an astonishing display of bravado and it underlined a huge transformation in the sub-continent's mindset. In little more than a decade, India's tech industry has made the leap from global weakling to emerging powerhouse. Surprisingly, a Canadian company -- Nortel

Networks -- was one of the main catalysts.

In the early 1990s, Nortel invested a small fortune in a handful of firms that went on to lead India's export boom -- Infosys Technologies, Wipro Technologies, Tata Consultancy Services and Sasken Communications Technolgoies. Nortel introduced Indian programmers to big-league telecommunications projects and supplied them with state-of-the-art gear, including India's first videoconferencing network.

Diju Raha, who grew up in Calcutta, was the Nortel executive who set everything in motion. "If it hadn't been for us,'' he says with uncharacteristic immodesty, "India would not be the tech power it is today."

China vs. India

For 10 years, ending with his retirement from Nortel in 1999, Raha had one of his company's most physically demanding jobs. He was the vice-president in charge of international R&D -- an assignment that involved responsibility for managing Nortel's alliances with technology services companies in India, Russia, China, Vietnam and Brazil. From his base in Ottawa, Raha was constantly on the move, serving as a link between R&D project teams in North America and specialists in the rest of the world.

His job took on special significance in 1989, following his participation in developing Nortel's longer-term growth plan. "We could see that a serious constraint was going to be the availability of scientific and technical skills," says Raha, the chairman and CEO of EximSoft International, based in Cary, N.C., with operations in Canada and India. "Enrollment in science and technical courses had already peaked in North America and the college-age population was declining," he says.

Despite regular visits to family members in Calcutta, Delhi and other cities, Raha's initial instinct had been to contract out Nortel's more routine R&D to China. "Remember, India was not a market for us back then. It wasn't open to outsiders." China, which was placing huge orders for telecommunications gear, most definitely was.

But Raha's early enthusiasm for China was deflected by a PBS television program which examined the business of writing software in the developing world. India was featured prominently. Raha spent weeks tracking down the show's producer, eventually finding him in Harrisburg, Pa. The producer told Raha only one other organization had been in touch -- the Central Intelligence Agency, which had been seeking insights about India's non-aligned status at what was then the tail end of the Cold War between the U.S. and Soviet Union.

Raha screened the PBS tapes and decided India was ideal for what he had in mind. The country was 10 1/2 hours ahead of allowing for the possibility of doing R&D 24 hours a day. And India's colleges and

universities were churning out thousands of English-speaking graduates with solid engineering and programming credentials. Many of the grads were heading straight to North America and Europe for further study or to join multinationals. But thousands more were staying home where they could provide Nortel with a deep pool of programming talent available for less than 30 per cent of the cost of a typical North American engineer.

Even so, it was no simple matter for Nortel to set up formal alliances on the sub-continent. Raha first of all needed to convince his North American colleagues that farming out jobs to India was a good idea. Many Nortel managers worked hard to keep jobs in North America where they felt they had more control over things. Some were dubious about the quality of Indian programmers. Still others were suspicious that their new Indian partners would share what they learned with Nortel's competitors.

Raha's first step was to find a sponsor within Nortel to get the Indian R&D project under way. He approached John Roth, today the company's chief executive but at the time a senior vice-president. Roth had run Nortel's R&D labs in the early 1980s and, unlike some of the firm's more junior managers, had no difficulty with the concept of contracting out some of the more routine R&D. He chipped in some start-up money.

Raha then went seeking talent. His first stop was Mumbai (then known as Bombay), where he visited Tata Consultancy Services, a unit of one of India's largest family-owned conglomerates, the Tata Group. "The facilities weren't very impressive," Raha recalls, "but the executives were world class."

Raha then flew south to the country's emerging tech capital of Bangalore, where he held talks with several emerging software companies --- including Wipro and Sasken, a three-person startup. "We were looking for enthusiastic people within the companies who wanted a challenge," Raha says. He awarded each of the firms a contract to help Nortel with some aspect of its software R&D. Later on, he assigned some work to Infosys, another Bangalore company then just finding its feet.

"I felt the projects shouldn't be so complex that we ensured failure," he explains, "but I didn't want them to be so simple they didn't provide a test." Among the jobs assigned was a project to convert software code from one computer language (FML) to another (VHDL). Other assignments involved the development of tools for testing telecommunications software.

Arun Kumar Singh, Wipro technical manager

The idea of using Indian programmers to complement North American R&D projects wasn't unique to Nortel. General Electric, a U.S.-based conglomerate, had begun linking up with Indian partners in the late 1980s, following meetings between former GE chairman Jack Welch and aides to the late Indian Prime Minister Rajiv Gandhi. But Raha had in mind something more ambitious. Right from the beginning, he says, he wanted to "engage the minds of Indians" and steadily ratchet up the sophistication of the R&D done on Nortel's behalf.

The Indian programmers completed most of the projects successfully and Nortel began assigning more complicated jobs. This is when the first real problems began emerging. "People in India weren't familiar with working in an environment with proprietary software and advanced equipment," says Joe Samuel, Nortel's managing director in India. "A lot of handholding was required."

India tech matures

Raha points out that India's top software companies at the time were very good at handling chores involving the translation of software from one type of technology platform to another. "This was well-bounded, well-defined work that could be done remotely without much supervision," he says. But jobs involving imaginative approaches to creating applications or products were a stretch for most of the local programmers.

India's software services industry was still in its early stages. In 1989, the country's entire software industry generated sales of only $150 million U.S. -- roughly equivalent to three months' worth of revenues at a single Ottawa software company, Cognos Inc.

India's companies were operating under severe government restrictions. They could not raise money, list on stock exchanges or import personal computers for their personal use without the permission of government bureaucrats.

More to the point as far as Nortel was concerned, India's software firms had little experience working on large-scale technology projects which required complex procedures and testing to ensure quality. India's notoriously inefficient telecommunications and power networks didn't help matters.

In 1991 a currency exchange crisis prodded India into loosening some of the restrictions on high-tech firms. The government move encouraged some of the more aggressive U.S. multinationals such as IBM and Hewlett Packard to begin setting up operations in India. This development put enormous pressure on India-based firms to shape up. Wipro, Infosys and the others began building California-style facilities on the outskirts of Bangalore in an effort to keep their programmers from

bolting to U.S. competitors locating down the road.

Suddenly, Nortel's influence was crucial. The Canadian firm encouraged Infosys and Wipro to develop enclaves of employees who worked exclusively on Nortel projects. The programmers were assigned their own offices and telephone exchanges. Nortel, concerned about the quality of overseas data links, also spent millions on satellite links, switches and other telecommunications gear.

"Nortel was a very strategic thinker," says Nandan Nilekani, the co-founder and chief operating officer of Infosys. "They insisted from day one that we put in very good telecommunications links from here to Canada and they provided us with leading-edge switches for us to work on."

To outsiders, the Infosys group assigned to handle Nortel projects looked very much like they were part of Nortel's global workforce.

These R&D units became known as dedicated offshore software development centres -- Infosys and Wipro eventually set up dozens of these centres on behalf of dozens of the globe's largest corporations.

But in the early 1990s Raha wasn't entirely enthusiastic about how things were developing. For one thing, the physical construction of facilities in India was unpredictable, making planning difficult. Making matters worse was the relatively high turnover of Indian programmers who were accepting jobs with other firms in the U.S. This made it more difficult for programmers to hand off assignments back and forth between India and North America and chewed up a lot of time in the Nortel management group.

The Indians were also less-than-expert operators of their new gear. For example, Nortel installed a videoconferencing link at Wipro in order to increase the number of face-to-face meetings between programmers in Bangalore and Nortel customers in Ottawa. It was India's first videoconferencing network.

Early on, though, Raha got a rude reminder of some of the limitations on the India side of the link. It happened when his Ottawa-based daughter, then in Grade 9, tried to shadow her father during one of Raha's visits to Bangalore. It was part of a class assignment aimed at gaining an appreciation of parents' jobs.

A video link was established but then Bangalore's power grid cut out, creating a temporary blackout. The video link remained, thanks to a battery backup. Unfortunately, Wipro's employees weren't aware of this and began shining flashlights in Raha's face. At the same time, other workers were stumbling about in the dark, talking incessantly. The net result, as seen in Ottawa, was an amateur night production. "I read them the riot act after that," Raha laughs.

The Indian firms learned quickly, however, and gradually won the confidence of their Nortel colleagues in North America. In 1995, says Deepak Padaki, an associate project manager with Infosys, Nortel assigned Infosys the job of adapting one of its biggest telephone switches -- the DMS-250 -- for several Latin American telecommunications carriers.

"We had built up a relationship with a manager on a previous project," says Padaki, "and he needed the work done in a hurry."

Infosys not only wrote the software code, but later assumed responsibility for managing and upgrading subsequent versions of Nortel's telecommunications switching software. By this time, Infosys and Wipro had developed a lot of confidence in their ability to handle large-scale R&D projects -- and were rapidly adding new clients such as Apple Computer Inc., Ascend Communications (now part of Lucent Technologies) and Nordstrom, a prominent U.S. retailer.

Indian programmers were also getting plenty of international experience. During the intial stages of most projects, the programmers and managers spent a lot of time in North America on customer sites, gaining a detailed picture of what was required. Then most would return to India to write the necessary programs. So, at any given moment, about 20 per cent of Wipro's employees are physically overseas.

Only a small chunk of this work involved leading-edge technology. When the North American firms moved from one generation of technology to the next -- for example, from OC-48 to OC-192 fibre-optic systems -- they would hand off responsibility for the older stuff to India and then concentrate on the newest products. From the Indian firms' point of view, there was nothing particularly demeaning about this setup -- the older products were still being used and required constant updating. And they provided a steady stream of services revenues.

By the late 1990s, Wipro and Infosys were reaching a respectable size. Infosys two years ago became the first Indian company to list its shares on New York's Nasdaq Exchange. Wipro followed suit on the New York Stock Exchange the following year. Each firm last week had a market value of nearly $11 billion U.S.

More than 1,500 employees of India-based firms currently work on Nortel projects, representing about 7 to 8 per cent of the company's global R&D. While the numbers of expected to rise to 1,700 or so by yearend, Nortel's Joe Samuel doesn't think Canadians need to worry about the possibility that Indian programmers will take over ever-larger chunks of Nortel's R&D group. "Companies won't move all their development effort to India," he says, "It has to be a balance. It's a resource pool buffer."

The relationship between Nortel and its R&D allies has reached an

interesting crossroads on another front. Programmers at Wipro and Infosys, for instance, are pressing for more interesting assignments, ones that involve working on leading edge technology.

"Most designers want to work in the most advanced activity they can," says Samuel, "And we're trying to accomodate them." Arun Kumar Singh, a technical manager with Wipro, cites a recent meeting with Nortel managers who had visited Bangalore. "They were asking us for new ideas about what we can do to improve the customers' products," he says. "The expectations have already changed. Nortel is no longer thinking of us in terms of low-cost programming."

In part, this reflects a new reality -- salaries for Indian programmers have been rising more rapidly than for their Canadian counterparts, thus reducing a once-huge gap. Samuel estimates it still costs Nortel 40 per cent less to use Indian labour. "It used to be much cheaper to do work in India," he says, "but it's still worthwhile in terms of the extra flexibility it gives us."

Already, Infosys is dealing with its higher labour costs by farming out some of its simpler programming assignments to sub-contractors in China.

Nortel will continue to develop the core technology that underpins its data switches, fibre-optic systems or wireless networks, while its Indian partners start to take on the job of writing applications or programs that will work with Nortel-built systems.

Nortel now has its eye on a bigger prize -- as a potential supplier to India's burgeoning telecommunications infrastructure. Nortel failed to win a few contracts in the mid-1990s because potential customers in India wanted to see Nortel invest heavily in its own labs in India.

"Customers kept asking us if we were committed to India," says Samuel. "We've been trying to rebuild our credibility."

Nortel took a big step last fall when it sent its chief operating officer Clarence Chandran to Bangalore. Chandran was born in Karachi, Pakistan just after that country was partitioned from India. His family moved south and he grew up in Bangalore. During his recent visit there, he assured the state's politicians Nortel would spend $350 million U.S. over the next three years to help India develop its Internet infrastructure. Chandran also promised to hire an extra 500 R&D employees over the same period and expand its relationships with Infosys, Wipro and its other allies in India.

"Clarence came to give his commitment," says Samuel. "We have some major activities going on in India on the business side of things," he adds, referring to Nortel's attempt to sell telecommunications gear to India.

Chandran may be one of India's most unusual ex-pats. Since he left

the sub-continent in 1969, he has returned only two times -- once in 1996 to visit a potential customer in Mumbai and again last fall. He dislikes being seen as an Indian businessman. When the magazine Business India recently profiled India-born executives who had made it big in North America, Chandran refused to take part, preferring to be viewed as a successful business executive, period.

It's a sentiment shared by Raha, who used to report directly to Chandran when he worked at Nortel. Both executives also live in North Carolina -- the site for one of Nortel's largest labs -- and maintain second homes in Canada. Chandran's is in Toronto while Raha's is in Ottawa.

However, Raha isn't quite as sensitive about the subject of his Indian background. Part of the difference may be that Raha came to North America on his own and still has extensive family links in India while Chandran left India at a young age with his family.

When Raha retired from Nortel two years ago, then aged 60, he had plenty of job offers from the four Indian firms that he helped to transform into global players. But he opted to lead a start-up to expand and capture the marketspace he catalyzed.

"It's our belief that the latest communications technologies are allowing knowledge workers of all sorts to go global," he says, "They can now work from anywhere."

Raha's achievements in India already provide ample evidence of that.

The sub-continent's growing army of savvy programmers now appear set to complete India's transformation into a tech powerhouse. Raha believes that is only the beginning.