The Software Industry in India: Opportunities and Challenges

By Narayana Murthy (Chairman and CEO, Infosys Technologies)

First of all, I really feel very happy being here today. I do get an opportunity to address audiences in several parts of the world and never before have I felt so happy as I am today - for a very important reason. To me, Hong Kong represents the best in entrepreneurship. It is the mecca of entrepreneurship. It is heaven for entrepreneurs. And, as an amateur entrepreneur who took his company from US$250 in 1981 to US$15 billion based on Indian market cap and US$27 billion based on the Nasdaq market cap, I feel so awed, I feel so dwarfed by the environment in this country.

Whether I go into a shop and meet a salesgirl, whether I meet hawkers on the street, whether I meet corporate leaders, the message is dynamism, entrepreneurship and can-do spirit. So I'm extremely grateful to Ronnie Chan, the Asia Society, Shankar, the Bank of America, everyone of you for this opportunity.

I will be speaking on the Indian software industry, the opportunities and the challenges.

Our vision is to make India the country of choice for customised software development. We in the Indian software industry believe that customised software development and maintenance is where there will be continued opportunities in the years to come. Unlike in the product marketplace, where one product could probably replace another, as we have seen time and again, in this industry we believe that the market opportunity will continue to grow for a very simple reason.

As long as corporations world-wide embrace new technologies, new business models, new paradigms and leverage the power of these to bring benefits to its consumers, we believe we have a role to play. After all, we all know, as Professor Michael Porter once said, strategy is about being unique in a marketplace, and being unique requires that you create a layer of customisation around even standard packing. And that's where we believe India will have an opportunity.

Let me talk to you a little about what the influential thinkers say about India. The World Bank's today rated India as No. 1 by the US people, as far as software outsourcing was concerned. The same thing with Der Spiegel, the famous German business daily. More than 25 per cent of Fortune 1000 companies use India as their software outsourcing centre. You can't really be recognised in the marketplace unless Nasdaq and the other well-known people in the marketplace recognise you.

Well, Indians have been able to contribute very significantly on a global scale in the high-tech area. UC Berkeley Professor AnnaLee Saxenian, made a study recently and found that somewhere between 27 and 29 per cent of start-ups in Silicon valley are headed by people of Indian origin. Hotmail, Sycamore, and Exodus are some great examples. Sycamore, a
company founded in Boston, offered their stocks at $38 and it ended the first day at $270. Well, it happens to be founded by a cousin of mine.

Of course, Infosys is talking about India and Infosys has the largest market cap amongst all the players in our market basket in the US. The market cap of Infosys among the market's software services companies is much more than all of the players put together.

And as I was telling you earlier, unless you talk about Nasdaq the story is not complete.

"In the heart of India amid an age old culture one company has pioneered a new way of doing business. Using cutting edge processors and communications, Infosys designs and builds software solutions for the world. Working 24 hours a day delivering overnight to clients around the globe, Infosys is growing an average of 60 per cent a year. Where do you learn about aggressive, innovative companies? Exactly, Nasdaq, the stock market for a digital world." (Nasdaq video clip)

Some well-known names have endorsed India's competence and have started their own captive workshops, captive software units, including Sony, Microsoft, Hewlett Packard, and GE. Every one of them has found that it pays to have software developed from India.

What are the competitive advantages of the Indian software industry? First, the availability of a large number of professionals who speak English - with a different accent of course, but hopefully reasonably understandable. India has the second largest manpower or talent pool available after the United States. This certainly has been recognised by several countries today including the US, the UK, and Germany. The Ambassador from Norway was telling me how they too are going to roll the red carpet out for Indian professionals.

The fact that India missed the Industrial Revolution, the fact that there are certain caste systems in India, meant that Indian intellectuals had to make do with pen and paper. For the first time in the history of this world there has been an opportunity created for people who are comfortable with pen and paper, and that's in the software industry. No wonder then that India has leveraged this opportunity to grow.

The attractive wage structure in India is of course a very important point. The average salary for an Indian software professional is somewhere around 20 to 25 per cent of the corresponding wages in the US.

Of course, the orientation of quality, methodology and technology of Indian companies is yet another important reason why India has been able to grow from strength to strength in this industry. In particular, the concept of project management is something that has been extremely well practised in the Indian software industry.

Finally, I must say that this is one industry where the government has been very proactive,
has gone out on a limb and made sure that the industry has a chance to succeed on a global level. I don't know how many of you know, today the best taxation regime for stock option plans is from India. It is much better than the US because in India what they have said is that stock options will be taxed only on the basis of capital gains at the time of sale of the stocks. The capital gains in India is just 11 per cent. For once we are even better than Hong Kong. I can tell you that's a rare thing.

The value proposition of the Indian software industry can be summed up as "faster, better, and cheaper." The Indian companies have taken responsibility on an end-to-end basis for new software development and for re-engineering. What do I mean by re-engineering? I mean by re-engineering taking an existing piece of software and making sure that it is upgraded to keep pace with changes in technology, or changes in the marketplace.

India companies understand the importance of maintenance. What do I mean by maintenance? I mean by maintenance, not only the 5 per cent of the time where the effort in maintenance is taken up in back-fixing, but also the 95 per cent, and most often as much as 97 per cent of the time, where it is taken up in organically evolving the software to keep pace with changes in business practices. So, that is really maintenance and that's an area where the Indian software industry has taken responsibility.

Indian software companies have also been very proactive in accepting, embracing, and practising state of the art methodologies and processes; in investing heavily in tools, technology, and infrastructure; in reducing time to market as well as cost; and in improving quality, productivity, and response time.

It's almost impossible today to think of any industry in the world, or any leader in that industry, without realising that behind that success is an Indian standing developing the information infrastructure for that company. Whether you talk in terms of Bank of America, Levi Strauss, J.P. Morgan, Nike, Singapore Airlines, Swissair, Microsoft, Sony or Hitachi, you would notice that these companies have leveraged the power of the Indian software industry.

In the new paradigm, the Indian software industries have brought tremendous value in the area of e-commerce. Nobody can be a significant player unless they understand and embrace the depth of distance and the "anytime, anywhere" paradigm that's brought to the table by e-commerce. Indian companies have of course embraced it in a big way and have helped corporations all over the world derive benefits from this paradigm. My own company derived about 18.8 per cent of its revenues last quarter from e-commerce.

As the miniaturisation in computing goes faster and faster, as the power of broadband communication increases, we will all see a move towards appliance computing. To control the appliances on a remote basis from the office or where ever, you need appliance computing and that's where the Indian software industry is working along with some of the leading people in the world.
Customer service is of course very important. You know, customer relations management has become very critical these days in the crowded marketplace where competition is fierce. Our fundamental model is what's called the "global software delivery model". What this model does is it seeks to minimise the amount of time that we need to spend at customer locations and maximise the effort that we can spend at cost competitive locations in countries like India.

I define "globalisation" as sourcing the global capital from where it is cheapest, reducing where it is most cost effective, and selling where it is most profitable, without worrying about national boundaries. In keeping with that, the global delivery model reduces the cost to the customer and brings tremendous value. The advantages of this model are twofold: (1) it's a scaleable model because countries like India have a large number of professionals; and (2) it also brings tremendous monetary opportunity for the customer.

On a good day, when the economy's doing well, it is easy for Indian companies to enhance their per capita revenue productivity. On a bad day, should the market go bad - that's what I don't want to happen - but if it did then the customers are much more likely to persist with the Indian companies because of their lower cost structure. This is a win/win proposition for the Indian software companies.

The Indian software industry was just US$5.6 billion last year. Of course that is very small by US standards. But what is impressive is that this is growing at a significant rate somewhere around 40 to 50 per cent. Out of this the export figure was US$3.9 billion and once again the growth rates are very, very high.

The primary export destination is the United States and Canada. We are in the US contributing about 25 per cent, Japan a small 4 per cent and we believe, as we move forward, Asia will play a much more significant role than it has in the past in bringing tremendous business opportunity to Indian software companies.

The aspiration of the Indian software industry is to get to US$50 billion by 2008 and US$35 billion in the domestic market. Of course, this means tremendous growth even in the domestic market, but let me tell you that even the domestic market is growing at a frenetic 40 to 50 per cent year after year, though the base is much lower.

The reason why this is all happening is due to a large pool of skilled professionals -- about half a million students graduating from engineering schools in the country. There are 10,000 colleges for science education, 116 universities and 500 institutes that provide computer education.

McKinsey conducted a study where they compared India with various competitors and they found that India brings tremendous value for money. In this 2 x 2 matrix, India is on the high side in terms of quality and low in terms of cost. Countries like Israel and Singapore are high in quality but high in cost too. Countries like China, the Philippines, and Hungary are low in quality and low in cost too.
Quality is an extremely important thing in our business. Of the 300 top Indian companies, about 185 or so will have reached ISO 9001 by June and the rest of them by September or so. One of the important paradigms of quality is what is called the capability maturity model. This model is a software specific model enunciated by the Software Engineering Institute. 13 of the 20 companies certified at the highest level, level 5 of the capability maturity model, are from India. Indian companies are taking to this as if there's going to be no tomorrow and this is a very positive thing.

What is the new paradigm? I believe asynchronicity in product development will be the norm because, asynchronicity improves productivity. Second, a global workforce in high tech will become the norm. Once upon a time, it was in the area of low tech items like shoes and apparel which offered opportunity for a global workforce. Now I think it's going to be in the high tech area. A collaborative distributor development model will become very important. For example, conceptualisation in Canada, architecture in France, design and programming in India and hardware in Taiwan will not raise the eyebrows of anybody.

24-hour service will become mandatory for corporations. What that means is when you combine the prime time of India with the prime time of the United States, you get 24 hour work days. In fact, already today it is happening in quite a few cases but I think this will become the norm. Collaborative maintenance and product problem solving, particularly based on geographically distributed knowledge teams, will become very popular and will in fact become mandatory.

India will become an important player in this paradigm. Engineers from India will become proactive innovators, and of course thanks to video conferencing technologies, Indian engineers will contribute from their homes and offices to making corporations becoming very, very powerful in the new marketplace. Architecture and design from India will become more common than it is today and back office support for the help desk will also be provided from countries like India.

It's not just India. I'm sure China will become a very major player in this field as we move forward. I am a great Sinophile and have tremendous respect for China. I think the Chinese are making a great effort in learning English. I have no doubt in the next 5 years China will become a very significant player in this area.

This is what one of the New York IT services companies said.

"This is a business where execution really differentiates the winners from the losers and also a very well thought out differentiated delivery model. They've done a great job of combining the benefits of doing onsite project management and delivery with an offshore capability that really complements their core competence which is really project management, delivering very complex software applications and really leveraging the economic benefits, the time to market benefits, as well as the quality that you can get into an
offshore development. And they've done just a phenomenal job in executing on that model."

What are our challenges as we move forward? I believe that Indian companies will have to show speed, imagination and excellence in execution in everything that we do because I find that these are the only three context-and-variant and time-and-variant attributes for success in the marketplace.

Global brand equity is extremely important because without global brand equity you can't enhance your per capita and your productivity and you can't become bigger and bigger. The ability to manage growth, particularly as a multi-cultural company, is a big challenge that we have.

And if there's one challenge that all the people-driven companies all over the world face, including the software industry, it is the ability to attract "enabled" and "empowered" employees. By that I mean trained employees capable of creating synergy between organisational objectives and individual aspiration. Bringing in the best and the brightest professionals is an important challenge because it provides sustainable and demonstrable value addition.

As Indian companies start looking at acquisitions more and more seriously, they will have to learn to acquire companies abroad and run them very successfully. Adaptability, agility and flexibility to respond to market needs is another important factor that Indian companies will face and of course strong customer retention.

These are some of the challenges that we have. Thank you very much. I think I took a little bit more time than I was allotted, but once again thanks a lot to everyone for this opportunity. I'll be able to answer any of your questions.

Question: Thank you. It's sometimes said that one of the reasons behind the success of the Indian software industry is that the government in India has virtually nothing to do with it. Would you agree with that observation? Also what do you think of this new office that New Delhi has set up to encourage the industry?

Murthy: You know, I believe in a minimalist role for the government in economic development. There's no doubt at all. But, having said that, let me say that the Government of India in the last 9 years has moved from a paradigm of control to a paradigm of catalytic effort, and as long as the government wants to be a catalyst, as long as it's a partner in progress, I think the industry will move further and further.

But also in a country like India, when companies like Infosys are pushing the proverbial envelope, you certainly need a very friendly government. For example, we had many discussions with the government about changing the regulation on the taxation of employee stock option plan. They said, 'Look, in the UK this happens, in the US this happens.' We said,
'Look, you need to go beyond the UK and the US because in this country we have to retain high quality people and we have to make this more attractive.' They did that. So I think as long as the government realises that they have to be a catalyst I don't see too much of a problem. I'm personally happy with the current Ministry of Information Technology, they have been great allies in our progress.

**Question:** Mr Murthy, in the beginning of your speech you did praise Hong Kong for its very strong entrepreneurial spirit. Assuming that Hong Kong is India's neighbour, and in fact we could be, we should be, how would you think that this entrepreneurial rich place could help out a place like India in its software industry. What sort of role do you think we could play at this late stage of IT development in the world?

**Murthy:** I think that's a very good question. One, I believe that time is ripe for e-enabling of corporations in Hong Kong and I think that is where one could start out by some kind of a collaboration between Indian companies and software companies in Hong Kong in providing e-enabling of corporations.

We could come, do joint projects, and wherein we learn from our Hong Kong brethren and they will learn from us. There is also an osmosis in terms of knowledge of processes and methodologies, and tools and technology. The mobile computing received the biggest boost in Hong Kong much before it happened in most other countries. So you people are extraordinary in accepting new technologies. So possibly I think both in the area of e-commerce and in the area of appliance computing there could be collaboration between Indian companies and Hong Kong companies in bringing value to the corporations here. That's one thing I can think of very easily.

**Question:** You mentioned globalisation means everyone goes to the cheapest capital. Can I ask you, you are the first Indian company to be listed in the United States, in your case, Nasdaq. What will Hong Kong need to do in order to attract you to come to the GEM Board? Do we have a chance?

**Murthy:** Absolutely. Whatever Hong Kong does I think it does it in the most dynamic, most spectacular manner. There is no doubt at all. For those of us from India it's really inspirational. Hong Kong is inspirational. Having said that, let me say that the reasons why at least the new economy companies from India will get listed on a hard currency stock exchange like Hong Kong would be three:

(1) We need to enhance brand equity in the marketplace. If getting listed on the Hong Kong Stock Exchange will enhance the brand equity of Indian companies, in this part of the world - Japan, Hong Kong, Singapore, Taiwan, China, etc. - I think that's a good reason.

(2) The second one would be creating currency for stock options, hard currency for stop options. I think today Nasdaq has helped us in creating stock options for our employees in the US, in Europe and even in Japan, and I think Hong Kong could well serve that role.
(3) While the first two reasons are much more certain, the third one I have not made much analysis of, and that is that listing on the Stock Exchange in Hong Kong could serve as a currency for acquisitions. And by and large today I think for the new economy companies, the companies that are most attractive are in the United States, not in Europe, not even in Japan.

To that extent I think we need to do a little bit of study before I could say that listing on GEM could serve as a currency for acquisitions.

**Question:** I've got a question linked with valuations and the sort of new economy. Being one of these key people in one of these new economy companies, do you think the industry is rightly valuing all these future companies and, if so, what needs to change? Is it that the industry's sort of the normal way of looking at valuations has to change, or what is your view about all these sort of valuations out there?

**Murthy:** You know, if you ask me a question on my business I can answer that very effectively. How do I satisfy my customers better, how do I enhance the repeat business percentage, how do I keep my employees happy, how do I make sure that the corporation brings better and better shareholder value. Those things I can understand. How to improve the top line, bottom line. But I think as far as the stock market is concerned, there are many experts who know things much better. I don't invest in the stock market. The only stock I own is Infosys so I may be the wrong person to answer that question.

**Question:** You mentioned that you have great respect for the Chinese because you feel that in about 5 years they will be very good at English and so they can enter other markets in terms of software services. Do you see the reverse happening in India? I mean, right now North America forms a big portion of India's exports. But are Indians going to be very good at learning Japanese, Mandarin, other languages to enter other markets?

**Murthy:** Well, let me say this, that at this point in time in Infosys itself we have classes in German, in French, and in Japanese. We have not started classes in Mandarin, but I'm sure once the time becomes right we will not be far behind. But certainly, Indian companies are making considerable effort in learning these languages.

**Question:** You spoke a lot about the capability of the Indian software industry to deliver services. It seems that you have a lot of them, good for you. But in the future do you think the Indian software industry, maybe Infosys, will move to deliver products rather than services? Do you think that these are qualities that the Indians can grow within, or they must acquire, which is the ability to deliver products and marketing?

**Murthy:** Well, one thing, let me say that we do have a product in the area of banking today. It only gives us 4 or 5 per cent of our revenues. Second, we did spin off a company which is primarily in e-fulfilment in the area of logistics. And third, we have just spun off another thing called Onscan which is an online web-based alert system.
Having said that, I agree with you, I think the Indian companies are yet to learn significantly in the area of brand equity creation. We have a long, long way to go in becoming market savvy. Our strength at this point of time is primarily in technology and development. As we move forward, as the companies grow stronger, you will see that. In John Brighton's message, he said, 'When we dealt with Infosys we had the similar level of confidence as dealing with IBM and GE.' To me that was an extraordinary compliment. But I agree with you, I think we have a long way to go in becoming market savvy.

**Question:** You mentioned some benign effects of globalisation. Could you tell us if in India that view is widely shared and also your own views about how globalisation affects India, whether actually everyone benefits equally or not? Thanks.

**Murthy:** Well, I think, you know, my view of globalisation, and that is every country has to recognise its core competencies, its comparative national advantages, and then compete in the marketplace based on those. With that, it will earn enough global currency to be able to import the best products at the least price from other countries. That's my firm belief.

Whether everybody believes it in India, I'm not sure. We Indians are very, very good in arguing. Not everybody may agree with me, but I must say that there is a growing mass of opinion moving towards this view.

With regard to the perils of globalisation, will everybody benefit? I think no other country in the world has demonstrated the power of free market as you have, as Hong Kong has. If this market has any message for countries like India, it is that we must embrace a minimalist government. We must let the marketplace be the ultimate decider, and unless you can create more and more wealth, you're not going to be able to create more jobs. You're not going to be able to solve the problem of poverty.

Whether we like it or not, there are going to be only a few people who will lead the creation of wealth and these are human beings - they need incentives, they need encouragement. While the trickle-down effect of this will obviously not happen overnight, I think it's definitely going to happen.

**Question:** As I Chinese I obviously very much appreciate what you have said about China. You call yourself a Sinophile and certainly I'm one to. However, there's no reason why China should not develop in the IT service business like Infosys or India has. You'll be with us in Shanghai at the annual corporate conference of the Asia Society later this week. Do you see China as a potential competitor? Do you see China as a huge market that Infosys can attack and win? Or how do you look at China vis-a-vis your company and vis-a-vis India?

**Murthy:** Though we haven't had any business in China, I try and make it a point to visit China at least once a year, and quite often twice a year, simply to see how that country has moved from strength to strength in the last 10 years. A lot of my friends in the bureaucracy used to
tell me when I talked in Hong Kong, Singapore, or South Korea, 'Oh, those are smaller countries whereas we're a large country and it is difficult.' I thought maybe there is some rationale in that.

But after China took off, opened up in 1978, I said let me look at another country which is bigger than India and which has also embraced progress. And I must say, in the last 10 years, the kind of progress that China has made is very, very impressive. I think there's a lesson or two for India to learn from there.

In the last two years we have had about 6 to 7 visits from the people of China, the bureaucracy of China, to Infosys itself. They have come, they have had detailed discussions with us. They have looked at our business model. They spent a couple of days and in fact they invited Infosys people to give talks on the quality model, the CMM model, and we have given those talks. We held seminars in Shanghai, Beijing and Nanjing. To me that is being very open-minded to say 'we will learn from whatever place it is in the world'.

Personally I do want China to become a competitor to India because I think competition is good. That will make the Indian industry, the Indian Government, become much, much more agile and adaptive. So I am personally for competition from China.

Thank you.

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