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Software Enterprises – Temples of New India

Narayana N R Murthy, Infosys Technologies Limited, Bangalore

1 Introduction

I owe much gratitude to the Governors of the Jawaharlal Nehru Memorial Trust for their kindness and generosity in inviting me to deliver the 23rd Nehru Memorial Lecture. I have neither the eminence nor the eloquence of the speakers who have had this privilege in the past. Their decision is based wholly on their affection for me and I am grateful for it.

It is not easy to speak about a colossus like Nehru, especially in a short lecture such as this. His influence has permeated every strand of developmental thought in the five decades of India's independence. Undoubtedly, generations to come will continue to benefit from his profound thought and philosophy. The history of independent India is laced with the myriad initiatives that he launched towards solving the problem of poverty, among other issues that he addressed. His pet theme was the creation of the temples of modern India – the universities, the dams, and the factories that comprised the foundation for the industrial infrastructure and associated pool of knowledge so essential to any modern nation-state. He knew that this was the only way of fulfilling Mahatma Gandhi's dream of wiping the tears of every poor man and woman in the country.

I recall a few words from his famous "Tryst with destiny" speech delivered on the eve of the attainment of independence when he said: "*A moment comes but rarely in history, when we step out from the old to the new, when an age ends, and when the soul of a nation, long suppressed, finds utterance*". What a great sentence!. It held true that day and holds good even today when India is poised to become a significant player in the global hi-tech industry. To me, the hi-tech enterprises that have sprung up in great numbers in the country are, indeed, the temples and shrines of the new India. I will talk about the importance of this phenomenon and also briefly touch upon what India needs to do to keep the momentum going.

While many tomes have been written about Nehru as a politician, a statesman and an administrator, very little is written about his belief that knowledge and scholarship would play a big role in the emancipation of the subjects of India. I am very glad to highlight three policy decisions that he took when he assumed the prime ministership of India. First, he created several institutes of higher learning including the IITs, the IIMs, The Bhabha Atomic Research Centre and the All Indian Institute of Medical Sciences. Today, over 75% of India's contribution to entrepreneurs in Silicon Valley, to academics in leading institutions across the globe and to the pool of CEOs in the US comes from the IITs. The backbone of engineering and managerial talent in India comes from this pool. Our current Prime Minister, Shri Atal Behari Vajpayee's dream of making India a significant player in the global software industry would not have been possible without Nehru's vision.

Second, he insisted that there be no import duties on books, journals and any knowledge instruments, even in the context of an otherwise high-duty, protectionist mindset.

Third, even in the era of scarce foreign exchange in the fifties and the sixties, he ensured that every Indian who could afford to study abroad was given the required foreign currency. I can imagine the intense opposition he would have faced from the jingoistic and less enlightened crowd, having come out of a colonial regime just then. These are truly the acts of a firm believer in an open flow of ideas from the best sources in the world. Nehru truly symbolized what Andrew Jackson said: "*One man with courage makes a majority*".

2 Do we need hi-tech enterprises in India?

From time to time, we hear divergent opinions on the key issue of the role of hi-tech enterprises in shaping the destiny of India. Given the pluralistic society that we live in, the vast disparity in education levels, and the long-term nature of the impact that hi-tech initiatives have on the condition of the common people, it is natural that there are opposing views on this topic. I would first like to address the need for embracing technology in creating a better India.

a) The purpose of science is to unravel nature and that of technology is to make the life of humans more productive and more comfortable. If a product has to succeed in the market, it has to do one of the following: reduce cost, improve productivity, save time or improve comfort. It is unarguable that Information Technology products have met these requirements remarkably well. Who needs these more than the poor Indian with his or her low disposable income and the resultant difficulty in fulfilling basic human needs? Let me give you a few examples to illustrate the power of IT for the common man. Fishermen in Pondicherry use wave pattern data on the high seas broadcast by the US Navy to improve their yield by as much as 40%. NASSCOM used IP-based videoconferencing to connect a taxi driver at Mumbai with his family in a remote village in Uttar Pradesh. Further, technology is a great leveller. It does not discriminate between the rich and the poor. For example, one of my younger colleagues, who is a janitor at Infosys, is extremely happy to use an ATM because it does not discriminate against him – unlike the clerk at the manned bank counter. Further, technology makes services cheaper. A balance inquiry at a manned counter costs Rs.40. The same transaction costs Rs.8 at an ATM while the Internet brings down the cost to just Rs.2! Who needs these more than the poor? The use of the e-governance paradigm for deployment of inexpensive, efficient, quick and corruption-free community and public services is another case in point. Information Technology can enhance transparency in decision making, and, thus, improve the confidence of the people in the government. I can go on and on. The need of the day is for our leaders to stand up and become evangelists for the cause of using technology to help the common man. I am amused to see some of our politicians propounding the irrelevance of science and technology for the poor Indian while holding remote interviews with journalists by way of mobile phones! This hypocrisy has to stop.

b) Now let me come to another important reason as to why we should embrace IT wholeheartedly. Today, we live in a global village. No country can afford to isolate itself from the global market. Even countries that did so for a few decades have realised the futility of their policies and have come back to the global bazaar, enhancing the share of exports in the GDP. We have to embrace an export orientation due to the following reasons:

b.1 Every country leverages its competitive advantages to create products and services for the global marketplace. In India, given that the purchasing power is very low, this is the most effective way to create high-quality jobs for our people and thereby raise the overall standard of living. In fact, I define self-sufficiency as being able to earn enough global currency from your competitive advantages to import the best products and services at the best prices from the global market. This definition is obviously at conflict with the traditional Indian mindset that emphasized vertical integration and import substitution. Unfortunately, this mindset prevailed amongst the politicians and bureaucrats for well over forty years after independence. While we have to concentrate on exports in every area where India has a strong comparative advantage, I would like to limit myself to software exports, an area in which I have a little bit of knowledge.

b.2 You have to maintain a certain healthy proportion of exports and domestic consumption in order to ensure balanced and de-risked growth in the economy. The contribution of exports to the GDP of India is around 9%, which is low compared to countries like China (25%) and Brazil (20%). Given the unpredictability in prices of essential commodities like oil, the need to

import technology, and the requirement that we maintain adequate foreign exchange reserves, it is essential that we enhance the contribution of exports to our GDP. In particular, software exports are a key to achieving this objective.

b.3 An export orientation helps Indian enterprises benchmark their products and services on a global scale. If you succeed in the highly competitive global market, you are likely to provide high quality products at the best prices even for the domestic market.

The tragedy of the Indian consumer is that he has been forced to put up with shoddy quality. An export orientation will help to remedy this.

3 Produce exports or services exports?

The first millennium saw India reach a high point in mathematics, astronomy, surgery and a few other similar areas, with people like Arya Bhatta, Varaha Mihira, Brahma Gupta and Susruta making seminal contribution to the body of knowledge in these sciences. The second millennium was a disaster for India since the country was under foreign rule throughout this period save the last 53 years. Unfortunately, the early conquerors concentrated on arts and pleasure, and did not encourage the advancement of science and technology in the country. The rule under the British started during an era when Indian curiosity, entrepreneurship and technology orientation was at an all-time low. Thus India missed the benefits of industrialisation. The Indian intellectual had to make do with pen and paper, and show his or her contribution in matters of the mind like mathematics, algorithmics and theoretical aspects of sciences. The emphasis, world over, was an innovation in mass manufacturing till the advent of software technology in the Eighties. Fortunately for India, the last twenty years have seen tremendous opportunity in software, which is essentially about algorithmics and conceptualisation. Thus the Indian intellectual now has an arena where he or she can excel despite the tremendous handicap that India has had in the global marketplace.

India has several competitive advantages in the area of software – 1) a large and growing pool of English speaking software-oriented talent; 2) the project management skills of Indians in managing large software projects ensuring completion on time, within budgeted cost and with the requisite quality and productivity; 3) the software-friendly policies that successive governments have instituted; 4) the lower cost of operations; 5) the ability to work round the clock by leveraging time zone differences between India and a majority of the developed countries.

Indian software companies have concentrated on software service rather than on products. They specialise in designing, developing and maintaining software that is specific to a customer need. The strength of India, at this time, is in the production of customized software and not in mass marketing and brand creation. This is because products require physical proximity to the customer, an environment that reveres innovation, and considerable domain knowledge. At this point in time, we do not have these factor conditions in India. Thus Indian companies have rightly concentrated on services.

It is fashionable amongst armchair pundits in India to criticize this approach and say that India should concentrate on products rather than services. Thanks to the strong influence of the Brahminical mindset among the intellectuals in India and the condescending attitude of the British civil servant towards the Boxwallah, the Indian intellectual had a healthy contempt for business and for businessmen. Let me dwell a little on the Brahminical mindset issue. Ancient India encouraged the caste system purely based on the belief in specialization of successive generations of a family in a given vocation or trade or an activity. That made eminent sense at that time. The result was that the Shudra tilled the soil; the Vaisya engaged in commerce; and the Kshatriya became the warrior and the defender. The Brahmin, thus, got the responsibility of

connecting the rest with God and was also the champion of all intellectual pursuits. Since his primary responsibility was to think of the after-life and to connect with the higher powers, he had little or no interest in anything that had to do with the present or which involved any physical activity. Learning for learning's sake was the motto. Using that learning to make any difference to society would be sacrilegious for two reasons – it was not chic and they might be held accountable! That mindset is strong even today in India; for instance, when I interview young boys and girls, they insist on working in esoteric fields that have no relevance to solving the problems that beset contemporary India. Their first choice would obviously be Artificial Intelligence (AI)! I have tried to elicit why they were interested in AI and their answer is usually that it is intellectually challenging and aspirational. Never mind that there were no real applications that had at least a semblance of relevance to India! You see the same attitude when our intellectuals comment on Indian companies not having a product focus. My answer to them is that product skills will surely be acquired and leveraged as Indian companies become more global and have better financial strength. The need of the day is to create a large number of high income jobs for our young men and women. As long as we run a business that solves problems of society, that creates wealth legally and ethically, that provides challenging and lucrative jobs, it does not matter whether we do rocket science or bee keeping. This is just what the Indian software industry is doing. There is also a belief that Indian companies do not do high value-added work. In my opinion, these criticisms are ill-founded. You will see an Indian software company behind most leading-edge IT applications in the world. Examples are numerous. Whether it is a next-generation securities trading system or a retailing system or a broadband wireless switch, you are likely to see an Indian company involved. The key questions to ask should be: Is there a market opportunity?; Is this opportunity profitable?; Do we have the capability to service the market?; If not, what can we do to build up the capability? What role should the government and the academia play in this? I will spend the next few minutes answering these questions.

4 The market opportunity

According to a study by McKinsey & Co., the total market opportunity for software services in 1998 was US\$ 270 billion. Of these, US\$27 billion is the opportunity that can be outsourced to remote locations like India. Of this, India had a share of US\$ 4 billion (15%) in 1999-2000. This opportunity is likely to go up to US\$ 250 billion by 2008. Prime Minister Shri Vajpayee has set a target of US\$ 50 billion for software exports by 2008. Even this target is only 20% of the worldwide opportunity for offshore services by 2008. As long as there are new innovations in IT, as long as the end-user corporations want to leverage the power of these innovations to create new competitive advantages in the marketplace, I see a significant role for Indian software companies. Thus, the market opportunity does not seem to be an issue at this stage.

5 What should we do to become a successful nation in IT?

For the first time in the history of India, we have received global acclaim. And this has been in just one field – software exports. While what we have achieved is creditable, we are still at the very early stages of our marathon. If we have to fulfil the target of our Prime Minister, there are certain urgent initiatives that the country – the political leadership, the bureaucracy, the academia and the corporate leadership – will have to take up. Let me talk about a few of them.

5.1 Evolve a consensus on the usefulness of IT

To bring the benefits of Information Technology to the vast masses of the country, we need quick decision making and focussed implementation of policies. This requires a consensus amongst all hues of political thinking that IT will indeed help the lot of the common man. We cannot afford prolonged discussions on whether or not IT is good. In fact our political leaders have to become evangelists for technology, in general, and IT, in particular. They have to lead

by example by using IT themselves and demonstrate how productive they have become by using IT.

5.2 Embrace competition

As my friend – Mr Rahul Bajaj – has said, the greatest management Guru is competition. Unless Indian companies realise the importance of customer service, the use of IT will not become all pervasive in the corporate world. This is even more true of government departments and the public sector. For these institutions to deliver faster, better and cheaper services to their customers by way of e-governance and e-commerce, they have to invest heavily in IT and reap the benefits on an urgent basis. Further, the government has to dismantle all monopolies that it has created in vital sectors like telecommunications and airlines.

5.3 Reduce friction to business

Today's competitive and dynamic business environment demands that quick decisions be made right in the boardrooms rather than after receiving approvals from New Delhi. In a country like India, the government does play a certain role in the destiny of a corporation. Further, as Indian companies move towards increased globalisation, they will have to push the envelope on rule sets – and the government will play a significant role in creating such a new rule set. This requires quick and decentralized approvals from state capitals and proximate government offices, if at all, rather than from New Delhi. The government has to become a catalyst rather than a controlling authority. My own experience is that the government has, by and large, become extremely responsive to the needs of the corporate world. It is just a question of fine-tuning in a few areas.

5.4 Enhance availability of talent

The software industry has witnessed a compounded annual growth rate of over 40% in the last five years. The domestic IT industry has grown at over 25% over the same period. The demand for IT exists today and is likely to continue to be strong over the next five to ten years. Thus, the need of the day is to improve the supply side situation. The IT industry is absorbing a large number of engineering and science graduates and is, in fact, attracting a large number of professionals from other areas of engineering such as power, construction, automobiles, steel, etc. Further, several countries have launched initiatives to attract Indian software professionals. Thus, unless we take urgent steps to start new colleges to produce IT professionals, increase the quantum of IT education in our existing curricula, and enhance the intake at various existing institutions of learning, the industry will not be able to grow at the required pace to reach the US\$ 50 billion target by 2008.

Further, the quality of education provided has to be improved significantly. This requires that we allow private universities to come up and also invite well-known educational institutions from abroad to establish a presence in India and thereby create a competitive scenario. Initiatives such as the Indian School of Business (ISB) and the Global Institute of Science and Technology (GIST) are good first steps in this direction.

There is also a great need for increased interaction between Indian industry and academia to push the envelope in applications and software engineering practices. This is particularly true if we want to become better at product development.

5.5 Improve infrastructure

It is unrealistic to expect the IT and the software industry to grow indefinitely unless we improve basic infrastructure like airports, roads, hotels, power and telecommunications. Generally, development of a nation needs to be organic and all-round. I do not see how we can reach a US\$ 50 billion target for software exports with our existing physical and technological

infrastructure. If we want the internet to be ubiquitous and benefit the common man, India's telephone density has to increase from the current level of 3 per 1,000 and also has to become far less expensive. India is perhaps the only country in the world that defies the basic laws of economics by imposing higher tariffs as the volume of telephone usage goes up! Further, in a developing country like India, the pricing of these services has to be looked at in relation to disposable income levels for various segments rather than being linked with costs of similar services abroad.

5.6 Embrace e-governance in a big way to bring transparency to critical decision making processes and policy formulation.

Continuing the significant progress made by the Government in its liberalization efforts, it is necessary that there be transparency in governance and policy formulation. This is mandatory if we have to have the benefit of participation by world-class companies in our nation-building process and in making our IT industry strong enough to be globally competitive. E-governance will improve transparency, reduce corruption and improve consumer comfort.

5.7 Create suitable conditions for increased entrepreneurial activity

India has done a good job in creating a suitable rule set for attracting venture capital to the country. The results are already perceptible. Indian rules on Employee Stock Option Plans are probably among the best in the world. However, in certain areas, we just have to reduce the hassle of dealing with the complex rules sets of myriad state and central government institutions, if we wish to fully reap the benefits from the above progressive measures.

5.8 Liberalize rules for internet, data and voice communication

The internet will be a key vehicle of growth for the Indian economy. Restrictions in India on voice-over-IP and on connectivity between the PSTN and private networks for voice and data should go. Tariffs for voice and satellite bandwidth should be reduced to globally competitive levels. Without these, it is unlikely that the vast majority of Indians will receive the benefits of the internet. Also, given that world-class communication infrastructure is a key factor condition for software exports, such barriers may hamper the long-term growth prospects for this sector.

5.9 Rationalize the duty structure for manufacturing

Unless our hardware industry grows in a big way, we will not be able to leverage the power of IT for the common man. Hardware costs will have to come down, which can happen only by increasing volumes. This requires a rationalised duty structure that supports value addition through manufacturing.

5.10 Facilitate listing on stock exchanges abroad.

Indian companies have built a credible level of awareness in the US and it is now possible for them to list on US stock exchanges. But, the conditions for a public company in India going in for a listing in the US are not very favourable, particularly with regard to the liquidity of the listed securities. Therefore, rules for overseas listings need to be liberalized further.

5.11 Create a regulatory framework that enables Indian companies to become world-class

Attracting global customers and investors requires that we enhance their comfort levels by instituting global standards in corporate governance. Similarly, bureaucratic procedures in setting up trading offices need to be minimized. We have to change our mindset from one of thinking that we are doing the international investor a favour to one of making them feel wanted.

5.12 Help reduce the prices of imported software and hardware

The government and the industry have to work together on this matter. The government has done a great job in reducing the import duty on software from a punishing 150% at one time to zero percent today. However, duties on imported hardware will have to be reduced to facilitate large-scale computerization across the country. Vendors will have to talk to their principals and establish special pricing schemes for India keeping in view the vast market potential.

5.13 Companies to focus operations to move up the value chain

By and large, Indian hardware companies have had some focus in their operations. However, this can hardly be said of Indian software companies. In fact, the most common complaint of clients abroad is that most Indian software companies claim every area under the sun as their area of expertise! While there may be many reasons for this, including low volumes in specific areas, such unfocussed operations lead to erosion of credibility and low quality of service to clients. A stronger focus will also help software companies obtain domain knowledge and thereby move up the value chain.

5.14 Develop better appreciation for IT

It is universally agreed that a key reason for the failure of IT projects is the inability of the end-users to appreciate the value that IT can bring to the table. An offshoot of this is the unwillingness of the end-users to pay a fair price for software. Often, users do not show adequate interest in allocating quality time to project personnel from their IT vendors. Usually, this results in inordinate delays and cost overruns. Coupled with the fact that the opportunity cost of taking up an Indian project is very high for an Indian software company, this explains why most India software companies are loath to take up domestic projects,

5.15 Create better brand equity abroad

High growth and high per-capita revenue productivity requires attracting the best customers in the marketplace and the best employees from the local talent pool. This can be done by establishing strong brand equity on a global scale. India has not been able to create a single global brand so far. The software industry offers an opportunity to break this jinx. But, this initiative requires visionary thinking, considerable spending and excellent execution.

5.16 Better collaboration between industry and academia

Our desire to move up the value chain and to become innovators in IT requires that we leverage the enormous capabilities of our academic institutions. Our brethren in academia also need to enhance their focus on problem solving orientation rather than the traditional Indian mindset of research for research's sake.

6 Conclusion

As I ponder the developments over the last ten years, I feel happy about the progress this country has made in competing in international markets, in accepting globalisation, in reducing friction to business, in benchmarking with global best practices, and in accepting competition from outside. But, these are just the first few steps of the marathon. Nehru laid the foundation for knowledge-based industries in India, and his doing so has now presented the country with an opportunity to move into the next orbit. I am optimistic that the political leadership, the bureaucracy, the corporate leaders and the academia will move forward with even greater enthusiasm and fulfil the dream of our first Prime Minister.

Jai Hind!