

Economic Prosperity through Education: Lessons to be learned from an Indian Experiment

Jainendra Navlakha

Florida International University, Miami, USA,
navlakha@fiu.edu

ABSTRACT

From the days of being considered one of the poorest nations in the world, India has become a model for achieving phenomenal economic prosperity quickly. The major factor contributing to this sea change is *India's investment in education*. Today, India produces 300,000 engineers every year, and still does not meet the demands of the industry. One field that has contributed the most to the economic development of the country is Information Technology. Multinationals and smaller companies alike, look towards India to satisfy their IT needs. The IT revenues of the country total \$23 billion-a-year making it the most important reason India has quadrupled the size of its middle class and lifted more than 100 million people out of poverty in the last two decades. India's economy has been growing steadily for the past 15 years, reaching 8 percent annual growth in the last two years. By comparison in the past four years, Latin America has grown by 4.5% annually. There are many lessons to be learned from this successful Indian experiment, the most important being the investment in education. This paper describes some salient aspects of this Indian experiment and identifies specific lessons that can be learned by other countries.

Keywords: Economic Prosperity, Educational Investment, IT.

1. INTRODUCTION

I came to USA in 1974 after completing my Masters of Technology in Computer Science from Indian

Institute of Technology in Kanpur, India, a premier educational institute for engineering education. I distinctly remember the chiding of some of my friends and relatives that I was contributing to the "brain drain" from the country, and that we should stay in the country and contribute towards its economy prosperity and technological developments. My answer was always the same, "I am going to pursue my doctoral degree in USA, and after finishing it and gaining some valuable experience, I will return."

Well, suffices it to say that circumstances never allowed me to return to my home country on a permanent basis. But strange things happened in the interim period, and no one in India now talks about the "brain drain" phenomenon. In fact, in the last 15-20 years, many policy decisions taken by the government at its highest levels have allowed many Indians living abroad to contribute and participate in the country's economic prosperity as educators, businessmen, venture capitalists, consultants, professionals, and simply as conduits to make more business available to Indian companies from the developed nations. Obviously, the most visible advancement has come in the field of Information Technology, but collaborations have been coming at a very fast pace in engineering, health, financial, legal, and other sectors, also.

To understand the genesis of this change, one needs to know that the major factor that has affected this evolution of India in the world economy is its *investment in education*. One can easily guess the field that has contributed the most to the economic development of the country; Information Technology. Multinational corporations and smaller companies alike, look towards India to satisfy their IT needs in many fields including health, finance, technology services, and manufacturing. Today, India produces almost 300,000 engineers per year and the industry demands have risen to a level that they experience a dearth of available expertise.

Using some subjective descriptions as well as official statistics, this paper describes the phenomena of educational investments in the

country and the economic prosperity achieved in the last few years. It further identifies specific lessons that can be learned from it by countries in similar situation as India was 20 years ago, which definitely includes many in Latin America.

2. INVESTMENTS IN EDUCATION

After the Second World War and before India gained independence just 60 years ago in 1947, it was very clear to the Indian political leaders that the future prosperity of the country would depend not so much on capital but on technology. The US government was persuaded to offer hundreds of doctoral fellowships to train Indian engineers and scientists under the Technology Cooperation Mission Program. However, it was obvious that this was not a long-term solution and India needed to produce its own indigenous specialists. This is believed to be the first conceptualization of the Indian Institutes of Technology (IIT).

The first IIT was created in Kharagpur (East India) in 1950. In the next 10 years, four additional IITs were created in Bombay (Western India), Kanpur (North-Central India), Madras (Southern India), and Delhi (Northern India). The institutes were geographically distributed throughout the country, and two more opened up in Roorkee (North-Eastern India) and Guwahati (Eastern India) in the early 1990s (Wikipedia, 2007). IITs are premier technological institutions in the country, and are comparable to the best institutes in the world. In fact, there exist approximately 130 applicants for each opening at IITs as compared to 10 applicants for each opening at Harvard. There are more than 175,000 graduates out of the first six IITs of which about 35,000 are in the USA (Times News Network, 2006a). The IITs along with 6 others (Indian Statistical Institute, All India Institute of Medical Sciences, etc.) are classified to be the *Institutes of National Importance* in the country.

To satisfy the growing demand from a large populace for engineering education, India developed a second-tier of 18 Regional Engineering Colleges. Top level graduates of these colleges are

extremely well-trained and receive full scholarship appointments for graduate studies at most famous US institutions. The number of educational institutes have been increasing at a very fast pace in the last few years. The three tables below (indiastat, 2007) give data about the growth of higher education system in India. Please note that these figures do not include the above mentioned Institutes of National Importance. Table 1 shows the growth of higher education system in India (indiastat, 2007).

Table 1: Growth of Higher Education System in India

Items	March 2002	2004-05	% increase
State/Central Univ.	133	229	72%
Deemed Univ.	27	95	252%
Colleges	13,842	17,650	28%
Total	14,002	17,974	28%
Enrollment	7.5M	9.2M	23%

Deemed universities are somewhat equivalent to Accredited Universities in the west.

The growth in the number of engineering, technology, and architecture colleges is detailed in Table 2. Note that from 1990-91, that is, in the last 16 years, the number of these colleges has increased from 282 to 1,512, an increase of more than 4-fold.

Table 2: Growth of Engineering, Technology, and Architecture Colleges

Year	Number	% increase
1990-91	282	
2000-01	680	141% - 10 years
2006-07	1,512	122% - 6 years

Table-3 categorizes the existing Engineering institutes along with the number of students attending them.

Table 3: Engineering Institutes in 2006-07

Category	Number of Inst.	Enrollment
Private Aided	27	15,286
Private Unaided	1284	483,130
Govt.	201	56,803
Total	1,512	555,219

The engineering institutes currently produce approximately 300,000 graduates every year. It is worthwhile to note that prominent institutes are sprouting up in the country with private funds and joint public-private ventures. Birla Institute of Technology and Science in Pilani has been a mainstay of engineering education for more than 40 years. Recently, while inaugurating a new university building at Manipal in the state of Assam, the finance minister stated, “the goal of higher education should be to deliver education of highest quality. The government has its own limitations and can not find resources to meet everyone’s aspirations. Here there is a clear space for private sector to play. When education sector gets more democratized and private sector takes the larger share of this responsibility, it creates more space for the government to extend education to more sections” (Business Line, 2006). Another example of public-private sector partnership is an agreement between a private foundation and the government of the state of Orissa to set up a world-class multi-disciplinary university with an investment of over \$3B in phases. The vision entails spawning of an education and research township around the proposed Vedanta University in a manner similar to how Stanford University enabled the birth of Palo Alto, the silicon valley’s cradle (P. Das, 2006, Rediff.com, 2006).

In addition to these growing indigenous facilities, India sends many students abroad for higher education. Since 1997-98, the number of Indian students attending US universities has been

increasing dramatically. In 2003-04, there were 79,736 in US, a vast majority of them (79% - 63,013 students) were graduate students (Institute for International Education, 2004). Other developed nations are also seeking Indian graduates and creating programs to attract them. The French embassy in India is working on several initiatives to woo more Indian university students to study in France by increasing the number of scholarships awarded to them, holding ‘EduFrance Fairs,’ and holding regular cultural familiarization sessions (S. Radhakrishnan, 2006). India is among the top four education source markets for New Zealand’s international education sector, and is valued at over \$60M a year. From a mere 164 students in 1998, the number of Indian students in New Zealand has reached 1,300 in 2005, and is expected to grow by 20-30% for 2006 (Times News Network, 2006b).

To facilitate educational opportunities for people at all rungs of the economic ladder, the Indian banks today offer educational loans worth \$22,500+ for education in India and more than \$45,000 for education abroad. Banks have realized that this is a profitable portfolio. Total amount of loans disbursed went up from \$66.8 billion in 2001 to \$260.7 billion in 2004 (Institute for International Education, 2004). Just 20 years ago, there were no such facilities available to support higher education.

The central government’s funding for education had an allocation of 6% of the Gross Domestic Product (GDP) over the years. However, the actual expenditure has been a bit more than one-third of the allocation. The real problem was not leakages (waste of money) but insufficient knowledge among the people about various schemes. In the 11th Five-Year plan (2007-2012), utilisation of at least two-thirds of this allocation (\$4.5B) is being guaranteed by the finance minister. Also, in his words, “A significant increase [for higher education spending] is likely.” (Business Line, 2007a)

The state spending on technical education has increased to unprecedented levels. The top three progressive and developed states have spent approximately \$330M, \$155 M, and \$140M over the last four years (Times News Network, 2007). The

state with the largest spending depicts an increase of 44% from its 2003-04 budget. On the other hand, three developing states at the bottom have increased their technical education spending in 2006-07 by 95%, 83%, and 37% over 2005-06 expenditures. It is clear that the whole nation is realizing the importance of technical education to uplift the economic status of their citizens, and prioritizing their budgets accordingly.

Very recently (Press Trust of India, 2007), the Group of Ministers headed by a cabinet minister has recommended 50% Foreign Direct Investment in higher education, paving the way for foreign universities to set up their campuses in India, in partnership with local institutions. Currently, almost 130,000 students go abroad for higher education. This initiative is expected to help the growing middle class students who spend about \$4B every year for education abroad.

3. ECONOMIC IMPACTS

Goldman Sachs's financial workbench wrote a classic paper, *Global Economics* (Goldman Sachs, 2003), in October 2003. Observing the world economic factors and growth potential of all nations, they predicted that the BRIC (Brazil, Russia, India, and China) economies could become a much larger force in the world economy. They claimed that by 2025, the BRIC economies could be half that of the G6 nations (US, Japan, Germany, France, Italy, and UK) and could be larger than the G6 economies in 40 years. India is projected to overshoot UK and Italy by 2015, France by 2020, Germany by 2025, and Japan by 2035. By 2040, the three nations with largest economies could be US, China, and India in that order. Their projections about the GDP growth rates placed India squarely on the top with an average of approximately 6% GDP growth for the next 30 years.

As it turns out, the report's projections about the Indian economy have been proven quite conservative so far. Indian economy has grown by 7.5% annually for the last four years with three years registering the annual GDP growth in excess of 8.5%. In the current fiscal year 2006-07, it is slated

to grow by 9.2% (Business Line, 2007b) after having grown by 9% in 2005-06. By the way, the Bombay stock market closed at its highest level ever on February 7, 2007 when the announcement about 9.2% GDP growth was made (P. Lesova, 2007). The Indian economy will cross \$900M GDP this year, and is expected to cross the \$1 trillion mark next year (The Financial Express, 2007). [Goldman Sachs's report predicted Indian economy hitting the \$1 trillion mark (in terms of 2003 US\$) by 2013-14.] The government has been able to increase its tax collection substantially, from \$25 billion in 2005-06 to \$35.5 billion in 2006-07, an increase of 42% (Business Line, 2007c).

The present boom is largely being led by industry (more specifically, manufacturing at 11.2%) and services. In the services sector, the largest contributor is Information Technology, and this could not have happened without the country's educational investments and achievements.

In the last two decades, India has quadrupled the size of its middle class, and lifted more than 100 million people out of poverty. It is a fundamental economic principle that the larger the size of the middle class, the larger will be the industrial growth as a substantial percentage of any nation's economic prosperity is tied to the buying power of its middle class. The rising tide of the middle class's buying power is lifting all other economic boats to greater heights. For example, Japan's Nissan Motors and France's Renault plan to build a car plant in southern India in collaboration with an Indian automaker amid strong demand for passenger cars from India's growing middle class (Mahapatra, 2007). With about one-third of the country's population of almost 1.1 billion younger than 15, the future looks very bright as this group enters the labor force in the coming years.

Please note that although India's economic performance has been fantastic at the absolute levels, its per capita gross national income is one of the worst in the world due to its large population that reaches 1.1 billion today. Table-4 below (Indiastat, 2007) gives the per capita incomes of US, China, and India for selected years.

Table 4: Per Capita Income in US\$

Year	US	China	India
2001	35,370	890	460
2004	41,440	1,500	630
2005	42,000	1,740	720

When I first came to USA in 1974, I had \$8 in my pocket. That was the maximum foreign exchange I was able to get from the Reserve Bank of India. Today, the abundance of foreign reserves available places no such restrictions on either students or businesses going abroad for higher education or business expansions. Table-5 gives foreign exchange reserves in India from 1990-91 to 2005-06 (indiastat.com, 2007).

Table 5: Foreign Exchange Reserves in India in Millions of US\$

End Of	Foreign Currency	Gold	Savings Deposit Receipts	Total
1990-91	2,236	3,496	102	5,834
1995-96	17,044	4,561	82	21,687
2000-01	39,554	2,725	2	42,281
2005-06	145,108	5,755	3	150,866

It is clear that the economic impact of educational investments in India has been nothing short of miraculous. Not only has the country elevated its economic status in the world, but it has earned itself substantial prestige, too.

4. INDIA AND LATIN AMERICA

From a country that captivated the world based on its spiritualism, religions, mysticism and such factors, India has quickly commanded the world's attention based on its economic prosperity and the associated economic power. The country is experiencing an explosion of optimism rarely, if ever, seen in the rest of the developing nations.

Since the US National Intelligence Council-- the long-term think tank of the CIA – recently predicted that India will be the world's third biggest superpower in 2020, after the United States and China, the country is brimming with self-confidence, drive and ambition.

The economy is booming as noted above. The GDP grew by 8% annually over the past two years after growing by an average of nearly 6% every year in the 80's and 90's. As compared to that, the GDP of Latin America grew by an average of 4.5% over the past four years after two decades of flat or negative growth. The economic reforms that have been introduced since 19991 have paid off handsomely, and are just beginning to be felt by the general population.

When asked by Andres Oppenheimer (The Oppenheimer Reports, 2007) about what had India done to achieve such high growth rates, India's Planning minister, Mr. Ahluwalia replied that one of the major changes implemented was to manage the shift away from an excessive state controlled system to a system that gives a lot more play to the market forces and the private sector. Many Latin American countries went through a privatization process in the 1990s without much success. However, India's privatization drive was very different from that of Latin America's. Rather than selling all state-run companies to private investors, India kept many of them alive but lifted restrictions that had kept private firms from competing with them. Brazil privatized the whole state-owned telecom system but India opened it up to private players. That made privatization of the airline and railroad sectors less controversial. Another difference between India and Latin America's 1990s privatization process is that India did them more gradually, with more public consensus. In this regard, India's thriving democratic system has proven to be very useful.

Today, Venezuela, Bolivia, and some other Latin American nations are announcing plans to nationalize key industries, which is completely opposite to the path adopted by India to achieve the successes of the past decade.

Both India and China have dramatically increased their presence in Latin America. China has been doing it for the last 5 years whereas India's trade with Latin America has skyrocketed from \$1 billion to almost \$5.3 billion last year, and is expected to double to almost \$12 billion in the next two years. What helps India further in its dealings with Latin America is the fact that it is best known in Latin America for its Buddhist history and spiritual movements that are increasingly popular in the region. India is a democracy with a fiercely independent foreign policy and shares with Latin America, its goals of expanding the Third World countries' role in the U. N. Security Council. Other than its political closeness, India is also well regarded in Latin America for its booming Information Technology and pharmaceutical companies. India will offer an alternative economic role model to Latin America based on exporting services.

In the field of Information Technology, one city in India that serves as the best role model for Latin America and other developing regions will have to be Bangalore in the state of Karnataka. In this city of 5.5 Million people, there are 1,850 IT companies including the who's who of the world's top computer firms. Together, they employ 450,000 young engineers who are responsible for the bulk of India's \$23 billion-a-year in IT revenues. The buoyant IT industry is the major reason why the country has quadrupled the size of its middle class in the last two decades, and lifted 100 million people from poverty. Thanks to this boom, the government has been able to increase its tax collection substantially, from \$25 billion in 2005-06 to \$35.5 billion in 2006-07, an increase of 42%.

How did this happen? In the words of IT secretary of Karnataka, it was based on education more than anything else. In the early 1900s, the rulers of the state realized that since the state did not have many natural resources, they had to invest in education. The last Chief minister of the state gave a lot of incentives to IT industries to open shops in the state, and removed many obstacles for multinational companies to do business there. Today, the state ranks fourth in the list of 35 richest states in the

country on per capita income basis. Almost all foreign leaders and successful business people keep Bangalore as a prominent stop in their itinerary when visiting India.

5. LESSONS TO BE LEARNED

There are many lessons that developing countries can learn from India to achieve economic prosperity.

- **Investment in Education pays:** Much of India's current economic growth has come from manufacturing and service (particularly, IT service) sectors. Both require highly trained engineers, computer scientists and IT professionals. The country produces the highest number of engineers every year in the world, and the number and quality of its technical institutions is growing at a brisk pace. IT revenues in the country have grown to \$23 billion-a-year and have allowed the growth of the middle class substantially. The world's biggest multinational companies have set up their software hubs in Bangalore and Hyderabad.
- **Meritocracy has its merits:** Education in India is largely free. However, the country has set up a meritocratic system in which students have to pass a rigorous high school exam, whose grades determine which university students can attend. Democracy and meritocracy work hand-in-hand quite nicely in India.
- **Continuity pays:** The Indian government developed a policy for economic reforms some time ago, and through many changes in the central government administration over the years, has stayed the course of its economic reforms. This is unlike many Latin American nations where a change in government brings about a change in its policies. In the latter case, no single policy gets enough time to go through the process and become successful.

- **Privatization, if done properly, is good:** India's path to privatization left state-owned companies alive but forced them to compete with new private firms. This helped reduce social opposition to privatizations. Starting with telecommunications, India has successfully opened up most sectors of its economy to the private sector, including airlines, railroads, and telephone companies.
- **Gradualism pays:** Unlike in many Latin American countries, where governments privatized state monopolies overnight, India opened its economy gradually over the last 15 years. That made these measures politically easier to implement.

In the 21st century information-based global economy, where computer software exports produce more revenue than sales of most raw materials, India's stable economic policies and merit-based education system not only make a lot of sense, but are proving to be effective in lifting the country's living standards. And on top of that, these policies are offering opportunities to every talented Indian in the world to contribute and participate in the country's economic prosperity as businessman, venture capitalist, consultant, and simply being a professional.

6. ACKNOWLEDGMENT:

I am indebted to the Executive Dean of our college, Dr. Vish Prasad, for initiating the ideas that led to the development of this paper.

REFERENCES

- Business Line. (2006). "Government, Private Sector must join hands to deliver quality education", www.thehindubusinessline.com, Sept. 7, 2006.
- Business Line. (2007a). "Education to get more attention in the 11th plan", www.thehindubusinessline.com, Jan. 11, 2007.
- Business Line. (2007b). "Economy set to grow at 9.2%", www.thehindubusinessline.com, Feb. 8, 2007.
- Business Line. (2007c). "Net direct tax collections up 41.2% in Apr-Jan", www.thehindubusinessline.com, Feb. 3, 2007.
- Das, P. (2006). "Vedanta varsity coming up in Orissa", www.thehindubusinessline.com, July 22, 2006.
- Goldman Sachs. (2003). "Dreaming with BRICs: The path to 2050", Global Economics Paper No: 99, Oct. 2003.
- Indiastat. (2007). Various statistics about India, www.indiastat.com, 2007.
- Institute for international education. (2004). "Education in India" in "Open doors 2004", the annual report of the institute for international education.
- Lesova, P. (2007). "Indian shares rally on growth forecast of 9.2%", CBS Market Watch Report, Feb. 7, 2007.
- Mahapatra, R. (2007). "Nissan, Renault partner with local automaker", Miami Herald, Feb. 27, 2007.
- Oppenheimer, A. (2007). Reports in Miami Herald, Jan. 18 21 22 23 24, 2007.
- Press Trust of India. (2007). "50% foreign investment in higher education", Feb. 5, 2007.
- Radhakrishnan, S. (2006). "French embassy to woo more Indian students", www.thehindubusinessline.com, Dec. 13, 2006.
- Times News Network. (2006a). "IIT alumni form platform to encourage entrepreneurs", <http://economictimes.indiatimes.com>, Aug. 1, 2006.
- Times News Network. (2006b). "India among NZ's top four educational markets", <http://economictimes.indiatimes.com>, Sept. 15, 2006.
- Times News Network. (2007). "UP, Bihar set to spend more on technical education", Jan. 31, 2007.

*Fifth LACCEI International Latin American and Caribbean Conference for Engineering and Technology (LACCEI'2007)
"Developing Entrepreneurial Engineers for the Sustainable Growth of Latin America and the Caribbean:
Education, Innovation, Technology and Practice"
29 May – 1 June 2007, Tampico, México.*

Wikipedia. (2007). "History of Indian Institutes of Technology".

Authorization and Disclaimer

Authors authorize LACCEI to publish the paper in the conference proceedings. Neither LACCEI nor the editors are responsible either for the content or for the implications of what is expressed in the paper.