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**Improving Quality of Development:
Perspectives from Operations Management**

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1 Introduction

According to the United Nation's global development network, UNDP, an organization advocating for change and to help people build a better life, the Human Development Index (HDI) is a summary composite index that measures a country's average achievements in three basic aspects of human development: health, knowledge, and income (<http://hdr.undp.org>). The HDI emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. It therefore brings into question the choices of national policies by a government.

2 Components of Human Development Index

The three basic components are health, education and living standards. The component of health is measured in terms of the indicator: Life Expectancy at Birth. The component of education is measured by two indicators: Mean Years of Schooling, and Expected Years of Schooling. The third component, living standards, is measured in terms of Gross National Income per Capita (refer Exhibit 1).

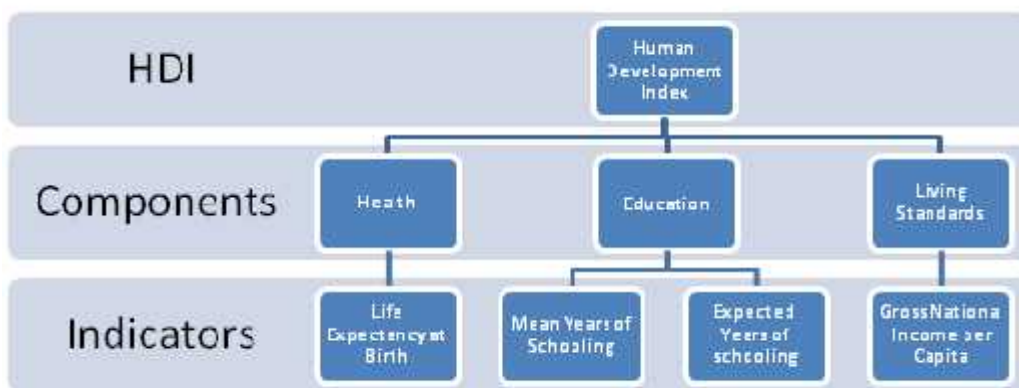


Exhibit 1: Human Development Index and its Components
(Source: <http://hdr.undp.org>)

3 How has India Fared?

A pertinent question in this regards is: how has India fared on HDI in the recent past? On the basis of 2010 Human Development Report, a comparative analysis of India on HDI and its components is shown with respect to the following countries: China, Bangladesh, USA and Argentina (refer Exhibit 2). The choice of these countries is based on the classification of countries provided by the Human Development Report.

	HDI rank	HDI Index Value	Life Expectancy at Birth (years)	Mean Years of Schooling (Years)	Expected Years of Schooling (Years)	GNI Per Capita (PPP 2008 US\$)	Classification (Human Development)
India	119	0.519	64.4	4.4	10.3	3337	Medium
China	89	0.663	73.5	7.5	11.4	7258	Medium
Bangladesh	129	0.469	66.9	4.8	8.1	1587	Low
Argentina	46	0.775	75.7	9.3	15.5	14063	High
USA	4	0.902	79.6	12.4	15.7	47094	Very High

Exhibit 2: Comparative Analysis of Select Countries on Human Development Index and its Components (Source: <http://hdr.undp.org>)

As per the classification provided, India and China are classified as “Medium Human Development” countries, Bangladesh is classified as “Low”, and USA is classified as “Very High”. While these classifications do not appear surprising, an interesting case is that of Argentina, which is classified in the “High” category. A comparison of India with Argentina (and also with other countries) on various parameters indicates that education emerges as a clear differentiator between India and the more developed countries. For instance, the mean years of schooling (years that a 25-year-old person or older has spent in schools) for India are 4.4 years, while that for Argentina is 9.3 years. Similarly, expected years of schooling (years that a 5-year-old child will spend with his education in his whole life) for the two countries are 10.3 and 15.5, respectively. Similar comparative measures can be brought about by analyzing the other two indices of health and income. Since education appears to be a salient factor differentiating various countries, let us examine it in some detail here.

4 What Are We Doing in Terms of School Education?

In recent years, Government of India has increased allocation to education sector to nearly 6% of GDP. The allocation has been increased from Rs. 152,847 crores in 2004-05 to Rs. 372,813 crores in 2009-10. Out of this, nearly 45% of the allocation is dedicated to elementary education. It is pertinent to mention here a remarkable step taken by the government with the introduction of Right to Education (RTE) Act, 2009. This act provides right to free and compulsory education for children in the age group of six to fourteen years.

The RTE Act 2009 puts extensive infrastructure norms on the schools based on the parameters such as classrooms, office room, store room, headmaster Room, kitchen, teaching-learning material, games and sports equipments, books in library, periodicals, newspapers, drinking water facility, number of urinals and lavatories separately for boys and Girls, etc. However, while the very idea of right to education is laudable, questions have been raised about the effectiveness of RTE Act 2009. In a series of surveys, ASER, the analysis of the research division of the NGO Pratham has revealed that “the quality of education for children between six and 14, the base for all future learning, shows a consistent decline. Only 53.4% of children in Class 5 can read even Class 2 texts, says the 2010 Annual Status of Education Report, published by leading education advocacy group Pratham.” (The Hindustan Times, 08/5/2011). Similar dismal results have been revealed in the context of the following parameters: Proportion of girls not enrolled in schools, Children in Standard V who cannot do division, attendance in private versus government schools, and so on.

5 The Perils of Current Approaches

Let us examine the current approach of delivery of education and healthcare from an economics perspective (refer Exhibit 3). Consider the cost-quality frontier of various delivery modes of education or healthcare.

In Exhibit 3(A), the current status of two different states of India is shown: one, which is high on both cost and quality (depicted as Industrial / urban / modern India, or simply “India”), and the other which is low on cost, but also low on quality (depicted as Agricultural / rural / traditional India, or also referred disparagingly as “Bharat”).

Exhibit 3(B) shows that recent initiatives by the government, such as Sarv Shiksha Abhiyaan, or RTE Act, have had limited effect, if any, on quality, but at a significant cost. The main problem with the current approach of securing right to education, or education for all, is that it is not sustainable and does not guarantee quality. As per RTE norms, already a significant amount of money is required to be spent on school infrastructure. For instance, if the government starts paying salary as recommended by the Sixth Pay Commission, education budget would have be raised much beyond 6% of GDP, possibly to above 15% of GDP on a sustained basis. Clearly, this amount of spending on education is not sustainable, and argues for new models for the delivery of the two essential components of HDI, namely, education and healthcare.

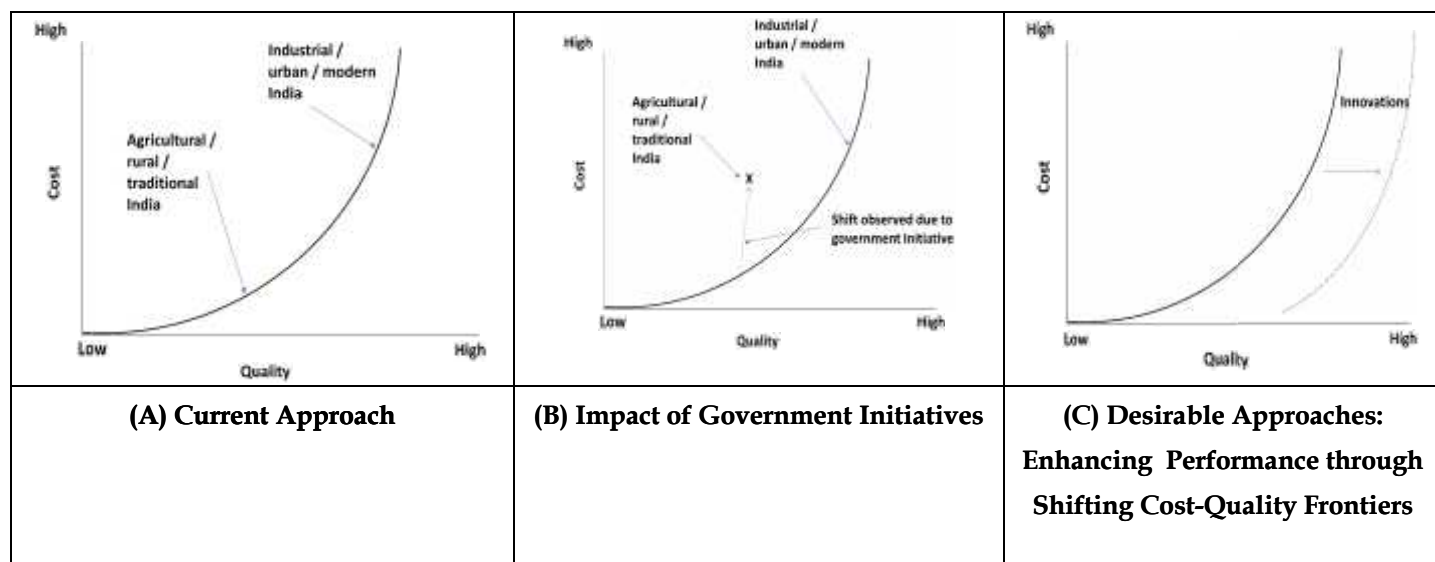


Exhibit 3: Comparative Analysis of Delivery Modes of Education and Healthcare

As shown in Exhibit 3(C), what is required instead is an approach, which will enhance the performance of such programmes by shifting the cost-quality frontier to the right. Two case studies are presented at the end of this article to elucidate such an approach. Let us first consider the main features of the proposed approach.

6 The Proposed Approach: An Operations Management Perspective

The current approaches of improving education and healthcare delivery rest upon input-based models and a “craft” mode of operation. This implies a system where skilled “craftsman” treats each job as unique. However, what is required for the benefit of all in the areas of education and healthcare is designing innovative delivery models which are scalable, low cost, and are outcome-based (refer Exhibit 4).



Exhibit 4: The Current Delivery Models of Education and Healthcare Need to Change

This is exactly where the ideas from Operations or Supply chain Management can be utilized. The basic model of operations management is build upon a transformation process, which takes into account various inputs, resources, and information to produce a desired output (refer Exhibit 5).

The evolution of this field of management took place in various stages, labeled as “revolutions.” The first revolution took place in Ford Motor Co. in USA in the time period 1910-1920, when the manufacturing moved from craft production to mass production. This ensured high productivity, scalability, and consistent quality; but at the cost of variety.

The second revolution was initiated by Toyota Motor Co. during 1960-1970, when the definition of the organization was extended from a firm to a chain, and the definition of the employees was moved from workers to problem-solvers. This resulted in improved productivity and quality, without sacrificing product variety. The third revolution, exemplified by organizations like Dell Computers and Bharti Airtel, can be said to have begun in mid-1990, and is still continuing. In the current revolution, the notion of the supply chain has been extended to a value network

with alignment. This approach uses information technology as an enabler along with low-cost customization, relationship with suppliers, maintaining technology and cost leadership, and using strategic outsourcing. We now presented two case studies, one from education sector, and the other from healthcare sector, to show how some of the concepts from the field of operations management can be used to come up with innovative models in delivery of education and healthcare.

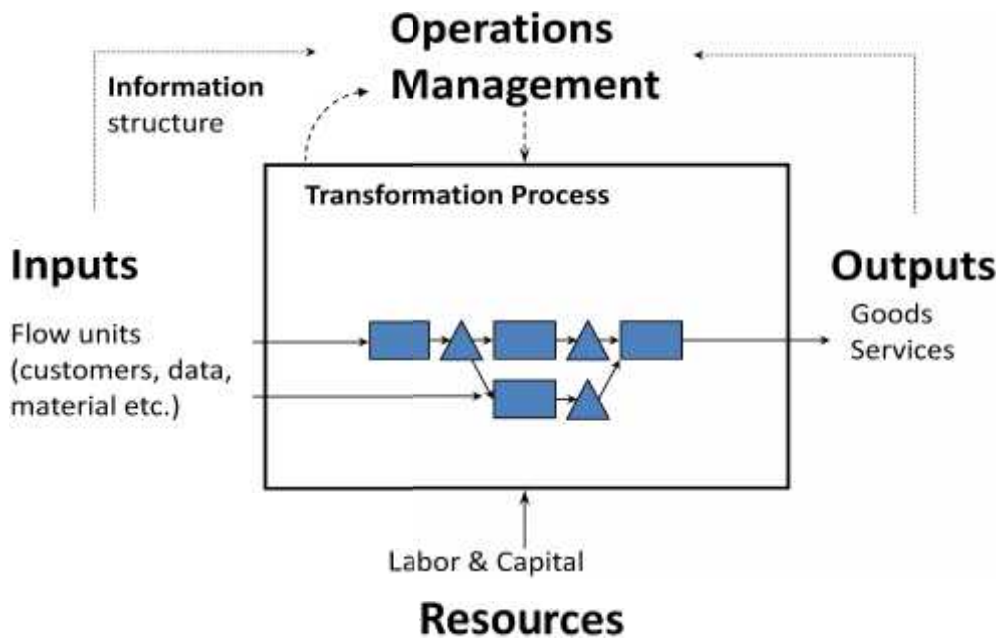


Exhibit 5: The Operations Management View

7 Gyan Shala: An Exemplar Case from the Education Sector

Gyan Shala, which stands for School for Knowledge / Wisdom, is an example of a nonprofit entrepreneurial start-up that has developed a scalable model to provide low-cost consistent-quality education to poor rural and urban children who are inadequately served by existing public education programs. Its model provides basic education using specially developed high-quality materials that are delivered by low-wage but well-trained teachers at locations close to the homes of underprivileged children. In short, Gyan Shala addresses access to education by redefining its goals (to focus on very low-cost basic education) and the delivery model (being conveniently located in the community), thereby both reinventing the distribution channel and lowering costs (Sushil Vachani and N. Craig Smith,

California Management Review, Winter 2008). Some commentators have likened Gyan Shala to the “McDonalds” of education in India. (<http://thesparkgroup.wordpress.com/2007/03/10/>).

Gyan Shala is an Ahmedabad-based NGO that was set up in 1999 to create a radical low-cost design for delivering effective education for poor children at the primary school level. Gyan Shala project has three objectives. First, it aims to evolve a system of education that ensures high quality on a mass scale, at a moderate cost, affordable in India. Second, it develops an institutional model and capability to run a large number of classes for poor rural and urban slum children, and demonstrate the functioning of its approach in a credible manner. In the process, it would offer the best possible value for money to its donors. Third, having established that the approach works on a significant scale without any loss in effectiveness, Gyan Shala would promote large scale adoption of its approach through partnership with the governments and other stake holders (<http://www.gyanshala.org/>).

The Gyan Shala model has the following key design elements:

- Location – The Gyan Shala model ensure proximity of the school to the village, or urban slums, so that the students can easily walk to the school.
- Cost control – Gyan Shala hires teachers from close to the local community, with a minimum threshold level of education and who are willing to work at low wages because they are either unemployed or are looking for supplementary income from part-time employment. Gyan Shala requires teachers to have a minimum of 7-10 years of additional years of formal education compared to the highest grades in which they would teach. Only such people are selected as teachers who are comfortable in working in neighborhoods where poor people live. Teacher accounts for 25% of cost at Gyan Shala while for other type of schools teacher accounts for 50% of cost. The result of these efforts is that monthly cost per child for Gyan Shala compares quite favourably with the other schools (refer Exhibit 6).
- Quality pedagogy - High-quality materials are developed and used, detailed teaching plans is provided to guide delivery of each class to ensure standardized, consistent and high-quality education. Teachers are trained

Type of school	Monthly Cost per child in Rs.
Gyan Shala	125
Government School	500
Low Quality Pvt. Un-recognized	200-250
Low Quality Pvt. Recognised	300-400
High Quality Pvt. Recognised	750+

Exhibit 6: Comparative Analysis of the Cost Structure of Gyan Shala

continually and monitored closely to ensure quality. Gyan Shala pedagogy ensures that the class environment is pleasant to children, free from threat, and conducive to activity-based learning. It focuses on a mix of three learning approaches: Storing knowledge (Memorizing), Knowing the process to find solution (Procedural), and Concept formation (Constructivist). The class processes ensure that no single module should be so long that it exceeds typical attention-span of small children. The class schedule includes daily whole class teaching, group work among 6-8 children that is supervised by the teacher, and feedback and supervision for each child individually. The class is supplied adequate amount of carefully designed and chosen learning aids for each subject stream. Gyan Shala spends more on learning material than on teachers. The daily teaching plan, worksheets and group activities are designed to complement and reinforce each other, and are decided by the Core design-cum-management team. The core team supplies teacher guides for each day, covering each of these components, for each subject stream.

- Scalable Structure - The organizational structure of a typical Gyan Shala unit is as shown in Exhibit 7. As shown in the exhibit, thus, a typical unit can handle nearly 15000 students.

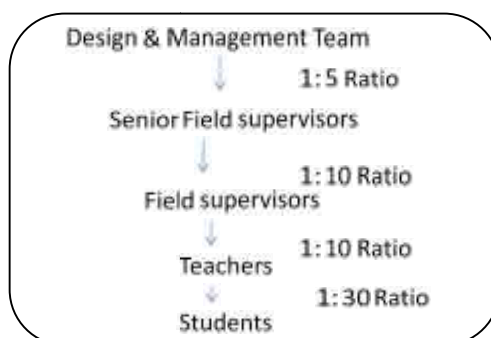


Exhibit 7: Structure of a Gyan Shala Unit

- Outcomes of Gyan Shala's Efforts

The growth of Gyan Shala schools has been quite impressive. Based on the data available, starting with 10 schools in the year 2000-01, the number of schools following Gyan Shala approach had grown to 550 in the year 2009-10. The 2000-01 programme was started in Ahmedabad, Gujarat, but has now started replication in other states like Bihar. In a comparative study carried out by MIT/Pratham in 2004, the mean performance of Gyan Shala Grade 3 students on Language and Maths exams was significantly better than the mean performance of the students from the "control" comparable schools of the municipal corporations. With adequate support from the donors and the government, Gyan Shala has the potential to emerge as a successful case study of scalable, good-quality and affordable education.

8 Aravind Eye Hospital: Compassionate Health Care

A successful, and often cited, case study in the field of healthcare is of Aravind Eye Care. With millions of patients served in the field of ophthalmic care, the Aravind Eye Care System in India has come to be called as McSurgery or in a way the McDonald's of cataract surgery in India: efficient, effective, scalable and sustainable (Stephen Miller, Wall Street Journal Online, August 5, 2006). Started by Govindappa Venkataswamy (popularly known as Dr. V) as an 11-bed clinic in 1976, it is today one of the largest eye-care systems in the world, catering largely to the poor in Tamil Nadu. Similar to the Gyan Shala model for affordable education, Aravind Eye Care System was inspired by the assembly-line model of McDonald's founder Roy Kroc -- learned during a visit to Hamburger University in USA.

A sense of compassion and commitment, and strong leadership are key elements of the Aravind model. The central principle that productivity is fundamentally related to demand makes it a viable business proposition. Volume brings down the cost and ensures the viability of the enterprise. Volume in turn is ensured by the combination of low cost, high quality and efficient procedures, as well as the appropriate use of technology.

Aravind Eye Hospitals try to maintain a ratio of 1:2 between paying and free patients, which keeps the enterprise financially viable. As a differentiator, the paying patients are offered a better set of post-surgical services. Integrating backward, a separate company has been set up to manufacture the intraocular lens, which helps provide quick and low cost cataract surgery. The model can be replicated, and some of its principles are universally applicable. These include: standardization, in-house manufacturing of affordable lenses, economies of scale, delegation of non-specialist tasks to less skilled workers, design of operations theater with two beds (one for the patient having surgery, the other for a patient being prepped), continuous process improvement, anticipation of demand, contingency planning in case of excess demand, and flexibility in terms of skill set of employees.

- Outcomes of Aravind’s Efforts

Today, Aravind Eye Hospital has created a system for sight-saving cataract surgeries, which has now become a five-hospital system, and the subject of a Harvard Business School case study (Case: Aravind Eye Hospital, Madurai, India: In Service for Sight by V. Kasturi Rangan, Harvard Business School Publishing, April 01, 1993). From April 2009 to March 2010, Aravind treated over 2.5 million out-patients and performed over 300,000 surgeries. A typical day at Aravind has 1000 surgeries, 6000 outpatients, 4-5 outreach camps, and 400 tele-medicine consultation. However, these volumes have not come at the cost of quality, as Exhibit 8 shows.

	Aravind Eye Care	Average Performance (all India)
Surgeon productivity: surgeries per year	1800	300
Bed productivity: Operations/bed	50	25
Quality (Infection rate)	4 per 10,000	6 per 10,000 (in U.K.)

Exhibit 8: Comparative Performance Indicators of Aravind Eye Hospital

9 Education and Healthcare: Innovative Models to Improve Quality of Development

To summarise the above two examples, it is clear that both education and healthcare sectors are manpower intensive. Providing high-quality service in both the sectors requires a skill-set which is priced highly in the job market. Ironically, however, these are also the sectors that have the greatest implications for the development of a society, and are needed badly by the poor and needy. This exhorts the business people and emerging entrepreneurs to come up with innovative business models which have the following in-built features (possibly at odds with each other): affordability, scalability, quality, and sustainability.

The case studies of Gyan Shala and Aravind Eye Care clearly show that a transition is required from craft model to process based models in the education and healthcare sectors. Some lessons that emerge from both the case studies are as follows. One, in the manpower intensive sectors like education and healthcare, which require dealing with large volumes, one needs to deskill the jobs by appropriate process design. Gyan Shala example clearly shows how a planner could do that by putting in a lot of effort in curriculum design and lesson and in the process, demanding lesser specialization and skilling of the teachers. This brings the necessary standardization in the processes. Second, wherever possible, technology could be put to good use for substituting the costlier manpower. Third, one needs to ensure high utilization of resources. This can be done creatively by parallel processing, as is done in the case of Aravind Eye Hospital, in which a patient is readied while another one is undergoing surgery. These lessons can go a long way in designing high quality and affordable business models not only in education and healthcare sectors, but also in other sectors of developmental interest.
