What Does It Take to Become a Software Professional?

Rather than place of origin (rural vs urban) or economic background, two educated parents most commonly characterise newly recruited software professionals in Bangalore. A survey of three software firms showed that fathers of all new recruits have at least a high school degree; 75 per cent are college graduates. More than 80 per cent of all mothers also have a high school education or better. Having two educated parents is a significant asset in a situation of information scarcity; however, no more than 4-7 per cent of all Indians have parents who are similarly qualified. Restricting better-paying jobs to this tiny segment of the national talent pool severely shrinks the prospects for national growth and individual achievement. How information gaps can be resolved through better institutional means needs to be publicly debated.

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I
Introduction: A Low Glass Ceiling

How far are people from less privileged backgrounds successful in moving up the economic ladder? To what extent are opportunities available in India that can enable talented youth to advance from inherited poverty to acquired well-being? Neoclassical theory and poverty policy assume implicitly that individuals will rise as far as their talents and available opportunities make possible. The effort, therefore, has been to expand opportunity through economic growth and to widen the geographic coverage of educational establishments.

Studies conducted over the past three years in 107 village communities located in three different states of India found that relatively few individuals have succeeded in escaping from poverty. In addition, almost as many households have fallen into poverty as have been able to escape from it during any given period (Table 1).[1] Compared to the large numbers of households that are poor, worryingly few have succeeded in breaking out of poverty. The simultaneous descent of large numbers into poverty indicates that growth in the country does not affect all households equally. Follow-up inquiries conducted in 71 villages of Rajasthan show that even those individuals who have risen out of poverty have not risen very far up (Table 2). Overall of the past 12 years, hardly anyone among more than 2,00,000 residents of these villages has obtained any better-paying job.

Globalisation and the growth of new opportunities seem to have largely passed by educated youth in these villages. About a 1,000 individuals in these 71 villages graduated from high schools during this period of 12 years, yet only one was able to become a software professional; one other became a civil engineer, one became a medical doctor, and one is practising as a lawyer in the district courts. Others who did get jobs mostly joined at very low levels in government departments, while many – most – who graduated from high school (and some who completed college) were unable to find any acceptable position.

Similar inquiries being conducted presently in villages of Karnataka show that the situation is not dissimilar to Rajasthan: relatively few village youth have reached levels commensurate with high ability. Most talented village youth have dropped out somewhere along the line, or they have joined the workforce at very low-level entry positions.

More than two-thirds of all Indians live in rural areas. Their inability to derive economic rewards in proportion to ability is a matter of considerable concern. A potentially enormous pool of talent is being wasted. Individuals suffer as a result, but so does the country. Connecting talent better with opportunity is a key task of public policy; the prospects for future growth are intrinsically bound up with its resolution. Yet, comparatively little has been done to consider how equality of opportunity can be better promoted.

This study makes a small beginning by looking at evidence of recent experience in the information technology (IT) sector in India. The IT sector has been in the forefront of post-liberalisation economic growth. Software development is seen world over as India's distinct corner of globalisation. Looking within this pool of new recruits in the IT industry, we address a series of related questions: Who has benefited from the creation of these large numbers of better-paying jobs? Have these positions been taken mostly by a narrow group of metropolitan elites? Or have people from less privileged backgrounds also succeeded in rising to these positions? What factors have assisted and what obstacles have hindered the rise to these positions of people from villages and other excluded groups? What lessons can be learned for expanding opportunities more widely?

Three Bangalore-based IT companies, MindTree, Philips, and Sasken, consented to participate in this inquiry. We are grateful to these firms and to their employees who took part in a survey. Detailed open-ended interviews with a selection of these newly recruited software professionals, with senior managers in several IT companies, and with experts familiar with hiring practices in the IT industry helped put flesh on the bones of the statistical analysis. A follow-up survey in a subset of rural communities rounds off the results reported below.

Section II presents the methodology and the results. Section III discusses the implication of these findings. Section IV concludes with some suggestions and questions for policy-makers. Few studies concerned with inter-generational mobility are available anywhere in the world.[2] The present study is admittedly limited in its scope and coverage. However, to the extent it helps identify some key factors assisting mobility, it will add to the currently meagre stock of knowledge about this subject.

II
Methodology and Results

A survey consisting of series of related questions concerned with an individual's educational and social background was designed, and it was reviewed by a select group of peers. Subsequently, it was pretested with a small group of eight individuals, who are also recently recruited software professionals but who do not work for any of the three participating companies. Based on these responses, a revised survey was designed, which was administered using an online survey tool. Human Resource Managers in each of the three participating companies compiled a list of software professionals who have been recruited at the entry level within the past five to 10 years. From these lists, 50 employees were selected in each company through random sampling. Eleven among these 150 employees were subsequently dropped, because they have moved on from these companies. Thus, a total of 139 employees in three companies constituted the effective sample.

Based on our initial invitation and subsequent reminders,[3] a total of 102 employees completed the survey forms online, making for a very encouraging response rate of 73 per cent – almost double the rate usually achieved in surveys of this kind.[4] While not statistically representative of the entire software industry in India or even in Bangalore, this survey is nevertheless indicative of general trends related to recruitment. The survey draws upon a random sample of employees of about the same seniority in three separate companies of different sizes; it was administered anonymously by computer to people, all of whom work with computers on a daily basis; and no pressure or inducements of any kind were offered or suggested. Internal consistency checks were in-built within the survey; additional checks were run as the first step in data analysis.

Interviews with HRD managers in a larger set of companies revealed that recruitment practices in these three companies are representative of practices in other IT firms. Inferences drawn from this sample of new recruits can reasonably, confidently be applied to recruitment in the larger industry. Some characteristics of new IT recruits are discussed below:

College education: State universities were the most common institution of study. Two-thirds of new entrants attended state universities. Less than 5 per cent attended either foreign universities or the elite Indian institutes of technology. Regional engineering colleges account for 7 per cent of new entrants. National universities account for another 11 per cent. The most common terminal degree is BTech (67 per cent), followed by MSc (11 per cent). One respondent has a PhD, one a MSc, and one a BSc degree, and one other has a BA as the terminal degree.

School education: We considered two types of distinctions while looking at school education. First, we looked at private versus government schools. Second, we looked at school location: urban or rural. Within the urban category, we distinguished among metropolitan cities, state capitals, and district capitals. Government and private schools were looked at separately for each location. Public boarding schools, because of their elite character, constituted a separate category, resulting in nine categories in all.

Table 3 shows the distribution of schools attended at the primary, middle, and high school levels. A fairly wide spectrum of school types was attended, with private schools predominating in the sample. Yet, government schools have no inconsiderable role: 27 per cent of the sample attended government schools at the high school level.

In terms of location, urban schools dominate. However, attending a rural school did not debar one from entry to the IT industry: a total of 13 per cent of new entrants attended high school in rural areas. This percentage is low when seen against the proportion of all Indians who live in rural areas: 70 per cent. How to raise intake from rural areas is an important question, explored later. However, the fact that rural high school graduates are represented in not inconsiderable numbers is encouraging. By exploring pathways that were taken by this pioneering lot, suitable policies can be designed to enhance this flow in future years. The data also show that assistance programmes were sparsely used. For their school education only 12 per cent of respondents

Table 1: Poverty Reduction over 25 Years in 107 Village Communities
(In per cent)

	Escaped Poverty	Fell Into Poverty	Net Poverty Reduction over 25 Years	Presently Poor
Rajasthan (35 villages)	11	8	3	45
Gujarat (36 villages)	9	6	3	62
Andhra (36 villages)	14	12	2	64

Table 2: Highest Positions Reached in 71 Rajasthan Villages
(Last 12 years)

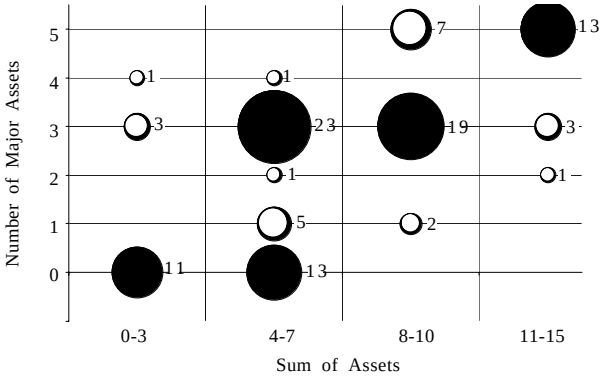
Accountant (2)	Lineman (7)
Advocate (4)	Panchayat secretary (4)
Computer operator (4)	Patwari (11)
Constable (8)	Peon (6)
Clerk typist (10)	Sub-inspector (4)
Doctor (1)	Schoolteacher (50)
Driver (4)	Soldier ('jawan') (32)
Civil engineer (2)	Software engineer (1)

Table 3: Schools Attended
(Number of respondents)

	Primary School	Middle School	High School
Metro city private	26	26	21
Metro city government	6	6	5
Public/boarding	1	3	4
State capital private	15	15	20
State capital government	3	5	6
District capital private	29	24	19
District capital government	3	4	9
Rural private	6	5	6
Rural government	9	10	7

Figure: Family Economic Background

Distribution of Wealth for New Hires



received any form of public assistance. During their college years only 14 per cent received assistance of any kind.

Gender: Additional hurdles exist for girls, especially those growing up in rural villages. One female interviewee stated as follows: "One thing is parents are not too much interested in pushing (girls) up and it is believed that at least for the girls the more that you educate them the more you have to get a higher qualified person [for a husband] which would be a burden on the parents [in terms of dowry and the rigour of the search]."[5] Further, many villagers are concerned about sending their daughters far from home. Girls are often forced to drop out of school once the highest level available in their village has been reached.

Place of residence: As can be deduced from the data on school education, the majority of respondents grew up in urban settings. Rather than metropolitan cities, however, most grew up in state capitals (32 per cent) and district capitals (23 per cent).

Interestingly, 18 per cent of respondents lived for the first five years of their lives in rural villages. Over the next five years, however, only 11 per cent remained in rural areas, with the rest departing to live in a city. This subgroup of 11 per cent, who remained to complete their high schools in rural areas, is of particular interest, and we conducted detailed in-person interviews with each of them.

Family economic conditions: Quite surprisingly – for one would have assumed that relatively poorer individuals would be poorly represented in the sample – respondents' family economic conditions exhibit a considerable range of diversity. While none among them comes from a background of extreme poverty, each of several faced conditions that are quite restricting economically.

To gain an idea about the economic situation of each of the respondent's families, we inquired about different assets that the family owned while s/he was growing up. A list of 15 assets was considered, including bicycle, radio, and gas cooking range, and also tractor, residential and commercial property, stocks and shares, and agricultural land. Assets owned typically by rural as well as urban families were included within this list. Further, quite minor assets, such as bicycle or radio, which many families ordinarily own, and also major assets, such as commercial properties and tractors, were both considered.

To help with this analysis, a coordinate system was developed (see the figure). The X-axis measures the total number of assets (out of 15) that a respondent's family possessed when she was growing up. The Y-axis plots four points corresponding to the possession of four major asset types: stocks/shares, white goods (refrigerator or washing machine), tractor and car. Because these are major assets, their inclusion within a sum is not sufficient. Considering these major assets separately helped to create the following classificatory scheme, which also helped to serve as a cross-check upon the completeness of responses. Four economic categories were developed.

Lower economic standing: A total of 15 respondents are included within this category. Their parents' households had between one and three assets in total when the respondent was growing up, and they did not have any of the four major assets. The most common asset among this group is a radio, followed by a bicycle. It is an encouraging finding and not one that we expected to uncover: about 15 per cent of newly recruited IT professionals grew up in households that possessed only a bicycle and/or a radio and no other significant assets.

Lower-middle economic standing: Forty respondents are included within this category. Their parents' households owned between four and seven total assets, and they had no more than one major asset: 34 of these households owned a TV, and 27 owned a refrigerator.

Upper-middle economic standing: Twenty-eight respondents fall within this category. Their parents' households had between seven and10 assets, and most also had between two and four major assets: all 28 owned a TV, 22 owned a car, and 15 owned a VCR.

Upper economic standing: Nineteen respondents belong to the highest economic category. Their asset sums range from 10-15. All these households owned a car and they also had two or more other major assets.

On average, the sample population has a considerably wealthier background than the general population of India. But unless the structure of opportunity is widened through public action, the same results as this can be expected within any other premier occupation in India. On the other hand, the wide distribution of larger circles throughout the graph indicates that a wide range of economic status is represented among the new hires. The bulk of the new hires are characterised by the two large circles in the middle of the graph, indicating the modal position within the IT industry of middle class recruits. It is encouraging to observe that a considerable number of individuals from lower and lower-middle economic backgrounds have also made entry to the industry. This observation provides reason for being optimistic about the prospects for extending the opportunity structure still further.

Critical limiting factor of parents' education: Evidence advanced so far shows that family wealth matters but it is not limiting. Place of residence (rural vs urban) is a more significant limiting factor. Most important, however, is a factor associated with parents' education.

Only those individuals have been able to gain entry into this industry whose parents are both quite highly educated. Respondents' fathers have either a Bachelors degree (46 per cent) or a Masters degree (31 per cent). Thus, more than three-quarters of the sample have fathers who are college graduates. Fathers of the remaining individuals in the sample have at least a high school education (Table 4).

Table 4: Parents' Education Level

(Number of respondents out of 102)

Level	Fathers	Mothers
PhD	3	1
Masters or equivalent	32	14
Bachelors or equivalent	49	39
High school	18	31
Less than high school	0	19

The father of not one person in the sample has less than a high school education. In addition, respondents' mothers are also mostly well educated, though not on average as well educated as their fathers. A total of 52 per cent of respondents' mothers have a Bachelors degree or better, while another 31 per cent have high school diplomas.

Two educated parents is the norm among new IT entrants: Hundred per cent of all fathers have a high school education or better, and over 80 per cent of mothers went to high school or further. It is this combination of highly educated fathers and mothers that most clearly identifies new entrants.[6]

While it is encouraging that two educated parents can help overcome limitations associated with family economic conditions or rural education, two factors make us pause and take stock of a broader situation: First, how many Indians have parents with similar educational qualifications? Second, why does parent's education matter so much for gaining entry to better-paying jobs?

The answer to the first question is not very encouraging: having two educated parents is very uncommon in India. Among people above 45 years of age (i e, within the age group of likely parents of new entrants), less than two per cent of rural residents are college graduates and less than 7 per cent have a secondary education.[7] Considering women alone, this percentage is even lower. Among rural women aged 15 years and higher less than 4 per cent have a high school education and less than 1 per cent are college graduates.[8] Among women who are older this percentage is smaller still.

Thus, if having two educated parents is a "requirement" for entry to better-paying jobs, then at best somewhere between 4 and 7 per cent of all rural Indians will qualify to gain entry. The rest, more than 90 per cent, will get disqualified, not because of any fault of their own but simply because their parents have little or no education. This is neither encouraging nor acceptable, which brings us to our second question. Why is the past so weighty for achievement at the present time? How does it help to have two educated parents? As we will see in the next section, parents' education acts as a surrogate for another critical factor: information.

In an environment where information is not otherwise easily available, having two educated parents conveys a definite advantage. Especially in rural areas, but also in small towns all over India, no one and nothing informs a young person about what she could become and how to get there. Where information about career opportunities is mostly propagated by word-of-mouth, parents who are clued into these streams of information are often the only recourse that any individual has. The best that many young people and their (uneducated) parents state when asked about future prospects and ambitions is "Some good job somewhere, perhaps in the government – or maybe something good with a private employer." Most are unaware of the range of opportunities available – and nearly all are uninformed about the pathways that lead to those opportunities.

Information about career opportunities and pathways is rarely institutionally available and must be individually accessed. Having two educated parents – who are networked with other educated and well-informed people – conveys a distinct advantage in an environment where career-related information is hard to come by, where no counselling centres or career guidance is available in schools and colleges. We will discuss these information gaps in more detail later.

Table 5: Examining the Combined Effect of 'Rural-ness' and Father's Education

Father's Education	Entirely Rural Background	Mostly Rural Background	Some Rural Background	No Rural Background
PhD	0	0	2	1
Masters		4	13	15
Bachelors	1	4	16	28
High school	3	2	9	4

Table 6. Constraints Experienced by Rural Residents
(in per cent)

Question: For what reason did you or other capable individuals in your cohort quit pursuing higher studies?

System-Related		Individual-Related	
Lack of information:	80	Economic conditions:	48
No counselling:	52	Not interested to study:	22
Poor quality teaching:	28	Household responsibilities:	8
No coaching:	26		
Lack of amenities:	16		

Note: Top three reasons stated by 182 respondents, selected by random sampling from all 18 to 35-year-olds in 20 Rajasthan villages.

III
Constraints to Upward Mobility

Information presented in the preceding section shows that the software industry has broadened its pool for recruitment to a fairly wide spectrum of households in India. Middle-class and middle-town households form the most common group for this recruitment pool. In spite of being broader than what some critics have portrayed, the recruitment pool for the software industry is at the same time narrower than what it might become in the future. The rural population is under-represented in the industry, and talent from these areas needs to be more effectively tapped through appropriate remedial measures.

To what extent is rural background an obstacle? Why should a rural background limit an individual's chances of entry? In order to ascertain what really matters – and what can be more easily overcome – we examined "rural-ness" in terms of two separate dimensions: family and education.

The family dimension considered three particular aspects: father's occupation (agriculturist or not), father's place of education, and parents' place of residence. The education dimension considered separately the primary, middle, and high schools that a respondent had attended. Four distinct categories were formed based on these two dimensions:

Entirely rural: Four respondents were classified as entirely rural. In terms of educational backgrounds, these respondents attended rural schools from primary school through high school. In terms of family background all respondents' fathers attended rural schools, both parents resided in rural areas, and they were agriculturists by occupation.

Mostly rural: Ten individuals fall within this category. Most went to rural schools for their entire schooling, although a few among them attended high school in a city (but middle and primary schools in rural areas). Their fathers were all educated in rural areas, and they had one of two other rural characteristics associated with the family dimension. Thus, a total of 14 individuals have mostly or entirely rural backgrounds. Two other categories capture the rest of these respondents.

Mostly not rural: Forty individuals fall within this category. Most did not attend rural schools at any time; they grew up in urban settings. The rural educational background of their parents is what placed most individuals within this category.

Entirely not rural: Forty-eight individuals have zero scores on both dimensions. These individuals never attended any rural school; neither they nor their parents have anything rural in terms of the different aspects examined here.

This analysis shows that the children of rural settlers in urban areas do not face any significant obstacles to entry: Forty such individuals are included within our sample of 102 respondents. Individuals who grew up in rural areas but attended schools (entirely or even in some part) in urban areas also have relatively few problems. Thus, a high degree of rural-ness on any one dimension does not significantly hinder one's access to better-paying jobs.

High scores along both rural dimensions are a different matter altogether. As rural-ness increases along both dimensions simultaneously, opportunities for entry become severely attenuated. At most 14 individuals in our sample of 102 had high scores on both dimensions of rural-ness – and only four respondents in the sample are entirely rural, with educational and family backgrounds grounded entirely in rural areas.

Personal observations gained through working in rural areas over several years coupled with additional information from follow-up interviews with these 14 individuals helped us develop some ideas about why "rural-ness" should matter so much. An overall low quality of teaching in rural schools is a significant hindrance. As important, however, and perhaps more easily remedied, is another hurdle associated with information gaps.

Lack of information about opportunities and pathways precludes many children and parents from looking beyond their immediate environs. These information gaps are wider in rural compared to urban areas.

Parents' education is critically important in these contexts of low information availability. As one respondent informed us with an undertone of regret,

> There was some guidance from parents. That was mostly about: you should study well and do well. There was no clear-cut career guidance [such as] this is the line you should go into,…making me think about it and [helping] decide what is good for me. I think that kind of environment was not there. It was more like: study well and do well, so you can get into a good job. What that good job was…was never very clear [to them].[9]

The contrasting situation was described by another respondent:

> There are a set of guys who are from more educated [families]… I know my friends whose parents were professors or doctors… They have done their BTech, MS, or PhD, because that is what they were [brought up] to do. They were very much aware [from the start]; they won't stop [short]; and were ready to go ahead further. People like me: all of us want to get into jobs; we want to start working; we want to start earning [more quickly]. Education is not [the biggest] hurdle; it is the perspective one has.[10]

Or as yet another respondent stated,

> My father was educated. He had done his [high school] old time. I mean he is no more. Because of his vision…we [my brothers and I] were forced to go into [these careers].[11]

Table 5 looks at the combined effects of rural-ness and fathers' education level. Even among individuals who have entirely or mostly rural backgrounds, educated fathers have made a significant difference. Notice that these fathers' education levels increase with regularity as one moves from the left (more rural) to the right of Table 5. Because city-dwellers' fathers (and mothers) have higher educational qualifications on average, they are better informed and better prepared to gain entry to better-paying jobs.

Parents who are not well educated and well informed can sometimes prod their children to drop out of school: "One of my best and most intelligent friends dropped out after his 10-plus [high school]… His family members used to discourage him – 'Why don't you take care of the existing land and agriculture,' they used to say, 'What we eat, you also eat. Why are you going away from us, struggling so much? What will you do?'"[12]

At other times, parents' lack of information about life opportunities in the world outside their village has been made up for by others who have influenced a child's career. In a few cases, this influence has come from an exemplary school teacher:

> We have in my village school till class 5, i e, elementary school. Then I went to the neighbouring village, where my grandparents live. I was there until class 7. Then one of my teachers recommended to my father to send me to urban school. I wrote… an exam [that is meant] for rural children from age 11-13 years… to pull in the talent… [I performed very well in this examination and] then I was funded by the government and went to [an urban] public school. That's where I did my 12th.

Question: Who advised you about these scholarship opportunities?

> One of my teachers… He actually processed, in fact, the whole application. He was the one who educated my father on this [pathway] and then ushered him [on]… Initially, when I got that admission, my parents were, of course, slightly reluctant to put me into [what for them] was a very new thing.[13]

Influence and assistance from this teacher had a life-changing effect for this one respondent, but it is an exception. In most other cases, teachers in rural area schools were not well informed, motivated or motivating. Many respondents echoed the view quoted below:

> The experience of the teachers themselves… they are so bound [up in] what they know. They were not very well trained, these teachers. They used to [impose] a lot of things on us…[but only] what they know; not allowing us to experiment, asking us 'With these studies, what job you will get? Why don't you go back and do some small work at home?' This – having less knowledge about the world by the teachers themselves – puts the students in a different mode. The students feel 'What am I going to get out of this?' The challenging thing I faced [right from] primary school, then high school, everywhere teachers used to say up until SSLC, 'Why don't you do a small diploma course and join some small mechanic?' Then I said 'No, let me try to do something more.' Then I went for 10+2. [After that] the teachers said, 'You have completed [this qualification, now] why don't you do teacher training? You can become a teacher.' That's all they knew; they are not exposed to what is available outside. The teachers themselves were not exposed to the world…[and they know] nothing about business, what happens in international affairs, nothing about internet.'[14]

Information about career opportunities is critically missing in most cases, and more so in rural areas. When interviewees were asked about what was lacking in their school education, they mentioned aspects such as lack of facilities and unmotivated and poorly trained teachers – and they also all stated lack of information as a major problem. One interviewee said: "Yes, I actually knew that there probably are many opportunities, but I didn't have any access. Even now we don't get an English newspaper in my village." Another said: "Coming from the very rural education in the government schools, [we] are least equipped with the information available outside."

Rural children are at a particular disadvantage in this respect, which appears to be growing (and not reducing in salience) over time. As our cities surge ahead in terms of technology and global connectedness, talented youth in villages are faced with increasingly higher obstacles.

> Facilities in [rural] schools must be improved. There is a lot of disparity now, I see…when I was studying many years back [this disparity] was not that much. With little difficulty I could have managed in Bangalore. But today if a person from my place (a rural village) comes to Bangalore and gets admitted to a good school, I am sure he will be totally shot down, because he would not be able to handle most of the things… There is a lot of computer education, there a lot of other skills that are being taught – a lot of things that are not being addressed in educational institutions in the periphery of the state.[15]

Referring once again to Table 2 we notice how hardly any individual coming from the 71 villages of Rajasthan succeeded in rising to any high-achieving position. Interviews with some of these individuals and other selected young residents of these villages were undertaken to inquire about the key obstacles they have faced. Table 6 presents a summary of their responses.

A very important reason for the lack of achievement that was indicated by these rural respondents relates to lack of information. In villages and in smaller towns at the 'taluka' (sub-district) and district level, knowledge about opportunities and career paths is very hard to access. Guidance is lacking to help children understand what career opportunities exist and how they should prepare themselves to compete for any promising career.

"He is good at mathematics and he wants to be an engineer, but no one here can guide him about what he needs to do," the father of a 12-year old boy told me in a village of Nalgonda district, Andhra Pradesh. Similar experiences have been narrated by countless other children and parents. Many talented children are being left behind because no information reaches their communities. Here is where educated parents and relatives make the critical difference. Parents who can find out early on about new and emerging prospects can steer their children down more promising pathways. But very few rural youth, much less than 10 per cent overall, are lucky enough to possess two or even one educated parent.

How can the pool of recruits and the structure of opportunity be enlarged more effectively? Expanding regular availability of high-quality information about career opportunities and career paths will be critical if we as a society and nation are to make better use of our talent pool.

One other factor poses a significant limitation to rural residents. A level of comfort with the English language is increasingly important for better-paying jobs, but just as they are ill-equipped in many other ways, rural schools are also not presently equipped for teaching English. Many interviewees mentioned facing problems with the transition from a vernacular primary school to high schools taught in the English medium. Students who once excelled in their local schools faced significant hurdles when they moved to higher education: "There I had to change my stream of language. Until the tenth standard I was in Telugu medium, my mother tongue. When I changed over, I lagged a little…I clearly saw that attention from the lecturers was not focused on me. I felt that difference clearly." Multiple factors account for the lack of English proficiency among rural students. "Fifth standard was the first time you are introduced to the ABCDs. We came to know of English only in fifth standard." Respondents pointed to differences in rural and urban education: "Education, books, and the way of speaking English. The exposure they [city kids] get is entirely different from a rural area."[16]

The inability to converse and read in English gets mixed in with an inability to gain access to useful information:

> Even extra reading books, libraries…they don't have that in my place. In my [native] place there is not a single English library… Even today it is not there. At that time [when I was studying in school] I was very interested in novels, fiction [but] I couldn't get that stuff. Whenever I find somebody has [books], I used to go and read. But everybody can't do that. If you had a good library, then at least you would know things like this are there in the world. You would be going there to read and try to understand. In Bangalore, you get that. For my son, actually, there is small library for kids. I can go and pick up stuff which he can read. I couldn't do that in my place. I still can't do that in small places.[17]

How reliable, timely and plentiful information can be made available more openly through institutional and not individualised channels is an important public policy question to consider.

Conclusion: A Call to Action

High growth rates sustained over more than 10 years have been commended by analysts of India's economy. It is calculated that every year a hundred or more new millionaires get created in India.[18] New careers have opened up in the thousands in the cities. A new breed of highly paid young professionals is driving real estate prices through the roof in Delhi, Bangalore and other large cities.

The IT sector has been in the forefront of this growth. The intake of college graduates by the IT sector has expanded from a few thousands each year in 1990 to more than 50,000 annually by 2004. Because of continuing high rates of growth, however, this sector is perennially short of qualified manpower. Its recruiters have reached out to training institutes located in ever smaller cities – and they have found large pools of talent everywhere, suitable to their purposes. Most new recruits are from smaller towns; a fair proportion attended government-run schools; and many grew up in households from the lower half of the middle-class spectrum.

The software industry has helped to equalise the availability of career opportunities in different parts of India. But it has yet to traverse the last mile: from the cities to rural villages. Not all miles are equally hard to traverse. The mile left uncovered so far will be the hardest to cover, but it is also the most important. The largest pool of the population, close to 70 per cent of all Indians, lives in rural villages. Yet talent in rural India has not been rewarded with opportunities.

Rural children face substantial obstacles to higher achievement. Here is a story that one of them narrated. We reproduce it here in considerable detail only because it illustrates multiple obstacles.

> We were very below average, you can say. We used to struggle for food sometimes… there used to be no money at home. My father had to borrow some money from his friend, and he used to bring grains for cooking that night. Till that time my mother used to wait for grains and then cook and sleep…She is from [an] agriculture family background. She used to tell us that it is very difficult to do agriculture, i e, cultivation. She used to tell me, 'You better study.' In fact, she sold her gold chain once, the neck chain, and she gave that money to me to continue studies… To my 10th standard, it was eight kilometres walking [each way]. I used to walk and study [at the same time]. [I did] Plus-2 [high school] in a bigger village, and at that time my father used to give me Rs 150 per month. My room rent was Rs 20. Some food items

we used to bring from home. [Later, when I was in college] my father used to give me Rs 300, i e, Rs 10 per day. My father expired when I completed my [undergraduate] degree. There was no money; there was nothing to start with. Then I requested a lecturer to help me in whatever way possible to do my postgraduation. [He] introduced me to one community centre in Bangalore [with a request] to help me out in my studies. They had never given such help to anybody, and they said they can't do it. My lecturer fought with them, saying 'You are the community people, and you can't help one of your members? If you can't help, then why this community exists?' He [persisted] and finally they agreed. They asked me to work as a warden in the hostel, and they used to pay my entire college fee. I used to get Rs 1,500 every month for my books and my clothes, and I used to work as a warden and take care of the 40-member hostel. Daytime, I did my college education."[19]

Hardly all rural children can be so determined. The obstacles they face are quite severe. As calculated above, somewhere between 4-7 per cent of all Indians have the kinds of educated parents that characterise successful new entrants to the software industry. India's software industry has grown very rapidly drawing upon this tiny fraction of the country's talent. Other high-paying jobs, in industry and in government, have also dipped into the same little talent pool. So far, so good; the pool has not run dry. But it might do so in the future, and growth will suffer as a result.

Normatively, there is no reason why all individuals should not be able to access opportunities commensurate with their talent. If the majority of talented villagers can rise no higher than constables or 'jawans', it is neither good for the individual concerned nor is it good for the national economy. When large proportions of a nation's population are excluded from a range of opportunities, the sum total of individual achievements is way below what can be achieved.[20]

Mis-utilisation (or non-utilisation) of talent is an important part of the complete explanation for why India's per capita income is lower than other countries. How talent can be better identified, developed and rewarded is a critical question that has to be addressed. Unless reasonable, workable, and timely resolutions are devised and implemented, we will fail in terms of economic growth and we will fail in terms of equity. The quality of public education in rural areas will have to be improved. And the availability of timely and reliable information will have to be substantially enhanced.

It is in everyone's interest to make sure that these things really happen. Industry will benefit by having access to a wider pool of qualified talent. Government will benefit when people from villages develop greater stakes in city-based economic growth. And rural communities will benefit when their more talented members achieve higher positions and can guide and assist others.[21] What stands in the way must be removed, and all who stand to benefit should pitch in and help.

Subroto Bagchi, a founder of MindTree and currently its chief operating officer, came up with a plan of his own.

I imagine four trains leaving from the four metro cities, filled with the brightest rural high-schoolers from the adjoining hinterlands. We – the IT industry – will pay for their travel. We will put them up in Bangalore, and we will show them what the IT industry is. Through lectures and personal discussions, we will inform them about the career paths that can help them enter our industry, and we will remain in touch with those among them who are interested to go further.

It is not out of charity alone that Bagchi was speaking; his longer-term corporate interest was a parallel – though admittedly, secondary – consideration. I hope Bagchi and his colleagues will go through with these plans, expressed after we had presented these results to a group of IT executives. I hope they will also invite rural schoolteachers along with students, for it is teachers who can guide a whole generation of students, and their awareness of opportunities must also be broadened and made more comprehensive. Governments and NGOs can also help in many ways. It will take the combined creative imagination of many to figure out the ways that can actually work better.

One thought that came to mind as I agonised over these findings consists of putting out a career handbook for rural high school students in different parts of India. Written in vernacular languages – English is still a weak point for many – this periodically updated handbook would list out different careers that are available, the nature of preparation required to attain each of them, the chances of success (and failure), the nature of the work involved, the remuneration expected, and the costs likely to be entailed. It would not take very long or cost very much to prepare the draft of any such handbook. Instalments could even be released in weekly editions of local newspapers.

Question: Suppose you had a pot of money, and you wished to help children in rural areas. What is the first thing that you would do?

I don't need money at all for doing this. I would just give information to the people, this is what you need. I need to create the balance, the urge to become whatever they want to become. [You] just have to make it visible to them – what they can achieve if they take this approach – and confidence that they themselves could do it. I have to sell that concept to them. That would be enough.[22]

Resolving the information gap will help remove a critical barrier. But it will not alone help connect all talent to commensurate opportunities. Improving the quality of teaching in rural schools is also very important. Teaching English from earlier on in rural schools may seem unnecessary or unpatriotic to some, but it is also the only way to make the playing field more level for rural residents. Rural kids are already handicapped in many ways. Handicapping them further by denying them English is hardly fair; in fact, it seems criminal.[23]

Finally, economic limitations will keep many youngsters from rising as far as their talents permit. Scholarship opportunities should be enhanced. As important, information about available scholarship opportunities should become more widely and freely available. Reward teachers whose students obtain competitive scholarships – and keep all teachers informed regularly of scholarship opportunities. Do the same in terms of career achievements. Teachers whose students become engineers, doctors, lawyers, etc, should be publicly recognised and their achievements felicitated. The crisis of motivation in rural education will have to be overcome. Information generation and dissemination will help as well with this goal. EPW

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Notes

[Some interviewees' names have been disguised. Comments from Kripa Ananathpur, Subroto Bagchi, and Indira Rajaraman are appreciated. The usual disclaimers apply.]

1 These results are reported in *EPW* issues of February 8, 2003; December 6, 2003; and July 17, 2004. They can also be viewed at www.pubpol.duke.edu/krishna.

2 The World Bank's *World Development Report 2006: Equity and Development* acknowledges with regret "the scarcity of datasets… Data from long panels are rare, and questions about family background are not always asked in surveys" (p 46).

3 This survey instrument is available on request. Copies of the invitation and reminder messages are also available.
4 The average response rate for an internet survey is around 34 per cent [Cook et al 2000].
5 Interview with Vasundhara S Devi (Bangalore, December 20, 2005, Transcript # BVB 03).
6 In terms of occupation, more than 70 per cent of all fathers had salaried positions, mostly in the government but also with private employers. Mothers, who are also well educated but select to be homemakers, form the other modal type. Nearly three-quarters of all respondents' mothers are homemakers.
7 Source: 'Consumer Expenditure and Employment – Unemployment Situation in India', NSS Report No 386, 46th Round, July 1990-June 1991 (cited in www.indiastat.com).
8 Source: 'Attending an Educational Institution in India, Its Level, Nature and Costs', NSS Report No 439, 52nd Round, July 1995-June 1996 (cited in www.indiastat.com).
9 Interview with Biju George (Bangalore, December 20, 2005, Transcript #BVB 02).
10 Interview with Brijesh Chenan (Bangalore, December 22, 2005, Transcript # BVB 05).
11 Interview with Venkata Reddy Gopavaram (Bangalore, December 20, 2005, Transcript # BVB 01).
12 Interview with Venkata Reddy Gopavaram (Bangalore, December 20, 2005, Transcript # BVB 01).
13 Interview with Vasundhara S Devi (Bangalore, December 20, 2005, Transcript # BVB 03).
14 Interview with Padmanabha Naidu (Bangalore, December 21, 2005, Transcript # BVB 04).
15 Interview with Narendranath Udupa (Bangalore, December 22, 2005, Transcript # BVB 07).
16 A study conducted in Bombay also shows how better returns to education have been obtained by those who learned English and whose families had connections with providers of jobs (Kaivan Munshi and Mark Rosenzweig, 'Traditional Institutions Meet the Modern World: Caste, Gender and Schooling Choice in a Globalising Economy', available at www.econ.brown.edu/fac/Kaivan_Munshi/bombay12.pdf
17 Interview with S Gopal.
18 "A recent report by the National Council for Applied Economic Research, based in New Delhi, forecast that the number of 'crore-patis', Indian society's rough equivalent of a millionaire, rose by two-and-half times in the last three years to an estimated 53,000 households nationwide" (Somini Sengupta, *New York Times*, February 28, 2006).
19 Interview with Padmanabha Naidu (Bangalore, December 21, 2005, Transcript # BVB 04).
20 Or as the World Bank's *World Development Report 2006* states, "Inequality of opportunity, both within and among nations, sustains extreme deprivation, results in wasted human potential and often weakens prospects for overall prosperity and economic growth."
21 A number of interviewees told us how the examples of others who had preceded them and succeeded served to motivate and guide their own career paths. Many successful villagers are actively providing help to the next generation. Balakrishna Prabhu mentioned: "Presently I have got one plan. Four or five of us – my cousins who have studied in rural backgrounds – [we are] searching for people in rural areas, understanding their backgrounds, and funding them up to [higher] education levels."
22 Interview with Padmanabha Naidu.
23 Alternatively, kids who attend private city schools should also be debarred from having classes in English until the same late stage. Even if that is desirable (which I personally doubt), it is not likely to happen.

Reference

Cook, C F Heath and R Thompson (2000): 'A Meta-Analysis of Response Rates in Web – or Internet-Based Surveys', *Educational and Psychological Measurements*, 60 (6), pp 821-36.