TRADING HARDHATS FOR SUITS: CHANGING CAREER PREFERENCES OF INDIAN HIGH SCHOOL STUDENTS AND ITS IMPACT ON GLOBALLY DISTRIBUTED WORK.

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ABSTRACT

The visible rise of globally distributed work (GDW) during the last two decades has been partly made possible by the presence of high value intellectual capital in various parts of the world, particularly India. This paper examines the supply side of GDW in India with special reference to the country's science and engineering talent. We discuss the confluence of two trends and their repercussions: The first is the social construction of engineering education as a measure of career and life success in India. The second is the nascent trend of viewing business education nearly as prestigious as engineering. We believe that if the newly found social desirability for business education continues as measured by increased enrollment in B.Com courses in Indian Universities, the country may find itself in an uncharted territory of scarcity of science and engineering graduates. Such a hitherto unknown scenario may disturb the delicate balance between demand and supply in GDM. The paper delineates the historical evolution of engineering education as a measure of career and life success for Indian students and identifies economic and social factors challenging that construction. Using primary data that are being collected from Bangalore and Kerala and building on previous research by one of the authors, the paper will test if there is indeed a shift in career preferences among Indian high school students from engineering to business education and explore its implications for GDW.

Keywords:

career choices, science and engineering education, engineering talent

1. INTRODUCTION

As the conference organizers have correctly articulated, Globally Distributed Work, or GDW for short, is a key characteristic of the modern organizations. While the radical reformulation of the socio-technical nature of work from geocentric to dispersed locations was initially based on cost factors, GDW today is synonymous with competitive advantage. CEOs of major MNC are fond of saying that their corporations have a solid GDW strategy in place to stay profitable in the global market place. While China and several South East Asian and South American countries have provided the low cost manufacturing advantage for years, one country in particular, India, has been at the forefront in reframing GDW as a business opportunity for high-end, knowledge-intensive, intellectual capital-driven services (Thatchenkery, 2006). Not surprisingly, several studies (e.g., Confederation of Indian Industries, 2005) have predicted that India will emerge as the top destination for Knowledge Process Outsourcing (KPO), something akin to high-end GDW for the global economy (Asuncion-Mund, 2005). KPO is expected to grow at 46 percent in India to become a $17 billion sector by the year 2010. Buoyed by its largest ever foreign currency reserves, increased positive media coverage, and best selling books announcing the arrival of India as an emerging global business powerhouse, India is indeed "shining.[1]"

Lost in this positive scenario is a complex understanding of the forces behind India's economic growth and the possibility that unexpected changes are in the horizon (Arora & Gambardella, 2005; Thatchenkery, Kash, and Stough,

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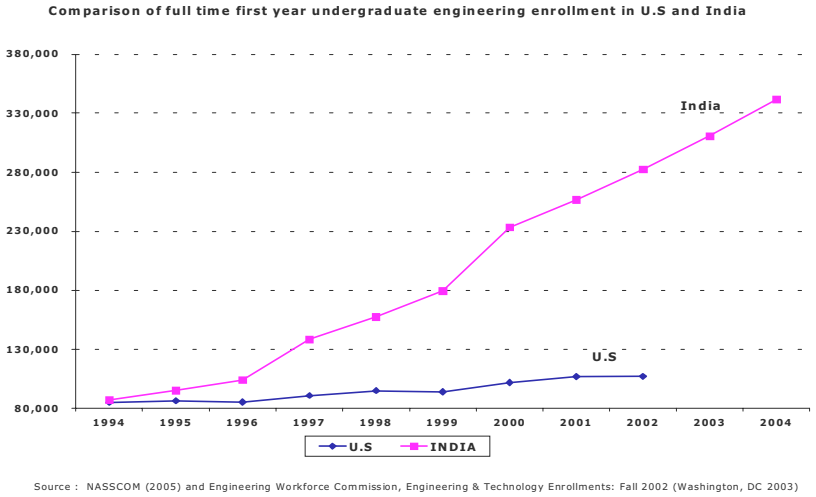
[1] *"India shining" was the theme of the then ruling party for the last general election in India in 2004. The best selling books include Luce, Edward (2007). In Spite of the Gods: The Strange Rise of Modern India. New York: Doubleday, and Friedman, Thomas. (2005). The World is Flat: A Brief History of the Twenty-first Century. New York: Farrar, Straus and Giroux. Another useful source is Thatchenkery, Tojo. (2005). India rising: Implications for U.S science and technology policy.* Association for Public Policy Analysis and Management 27th Annual Conference. *November 3-5, Washington, DC.*

of expression, and free market values.



Source : NASSCOM (2005) and Engineering Workforce Commission, Engineering & Technology Enrollments: Fall 2002 (Washington, DC 2003)

An analysis of students enrolling in undergraduate engineering programs in India and the U.S. shows (see above) that there has been an exponential growth in the number of students opting for engineering programs in India during last six years as against a near stagnant growth in the U.S. Even though India has a population of over a billion, due to the high illiteracy, only small percentage of them constitute the high school seniors from which the engineering educational choices are made as opposed to the U.S high school seniors for whom high school education is mandatory and free. Thus, the significantly higher number of students from India going for engineering education is particularly welcome in the context of growing human capital needs for GDW.

There are controversies about how large are the Indian engineering student body or the number of graduates. In particular, a recent study has raised questions about the quality of engineers as well, especially of those not from the IITs or Regional Engineering Colleges (Gereffi & Wadhwa, 2005). Even then, it is indisputable that engineering education has been one of the most sought-after fields of studies in India. The conventional wisdom among policy makers in the U.S. so far has been that a decline in the number of engineering students in the U.S can be compensated either by hiring Indian engineers on H-1 VISA or through efficient GDW.

One of the best indicators for the desirability of engineering education in India is the amount of “capitation fee” charged to students in engineering schools. Capitation fee is the amount above the regular tuition that students (in practice, parents!) are willing to pay in return for admission in private engineering schools. This is sizable amount and range from two to ten times the annual salary of a mid level private sector manager or officer in a government agency.

2.2 DRIVERS BEHIND INDIA’S STRENGTH IN SCIENCE AND ENGINEERING

2.2.1. Social construction of engineering education as career and life success

What is the reason engineering education is valued very highly in India? From November 21, 2002 to January 6, 2003, the first author conducted twenty two interviews with top executives from seven Indian IT companies, and two former executives of American companies who worked with Indian IT vendors to explore this issue. A thematic analysis of the interview data suggested that in India engineering education is socially constructed as a predictor of career success by a complex mechanism of institutional and societal incentives. Career success in India is synonymous to life success. It is typical for a family to take on a debt of over five times their annual income to pay for sending a son or daughter to a private engineering college. The most desired choice of education and profession for a high school graduate have been engineering or medicine since India’s independence in 1947. Getting accepted into an engineering school is widely seen as a measure of achievement, success, pride and satisfaction for students and parents (Thatchenkery & Gopakuamr, 2005; Thatchenkery, 2006). The trend does not end at undergraduate level.

According to the study, there is less difference in attitude of people across income groups. The jump is only from 54% for those in the bottom quintile to 73% in the top most income quintile. Over 36% of the illiterates believe that S&T has a significant impact on the economy as compared to 91% post graduates. On the whole, people believe that the benefits of science and technology outweigh (by 1.1) the perceived harmful effects. Among the people in the bottom most quintile, 72% believe that S&T make life easier and more comfortable and this goes up to 87% in the top most quintile. Over three fourth of people in rural area believes that S&T will make life easier and healthier (against 80% for urban areas) and 57% believe that S&T make work more interesting (68% for urban areas).

This heightened public awareness and faith in science and engineering coupled with the social construction of engineering education as a measure of one's success in life is a good explanation for the higher enrolment of Indian students in engineering programs.

2.3 Engineering education in the twilight zone in India: The tipping point

India is at a tipping point with respect to science and engineering education. On the one hand, the country is still strong in engineering education. But changes are in the horizon due to a gradual accumulation of social desirability for business education. Such a shift has already happened to India's closest ally in GDW, the United States. The National Intelligence Council's year-end assessment (Mapping the Global Future, 2004) cautions that the U.S may not sustain the leadership position in science and engineering for long. A study (July 2005) of the *National Bureau of Economic Research* cautioned that "more than half a century of U.S. dominance in science and engineering may be slipping as America's share of graduates in these fields falls relative to Europe and developing nations such as China and India."

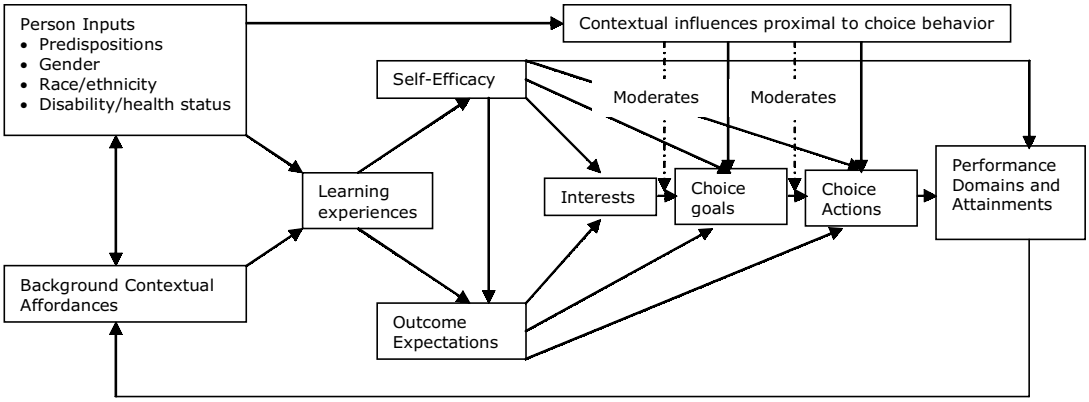
The first sign of change in career preference among Indian students comes from the popular media. India's leading newspapers today carry hundreds of advertisements from private engineering schools announcing new business degrees in addition to their own existing engineering programs. This is in addition to the hundreds of small private colleges that have sprung up in towns and metropolis all over India providing only B.Com-type degrees. Meanwhile, the number of seats allotted to B.Com in well established and traditional colleges have tripled or quadrupled while the enrollment for basic sciences such as biology and zoology has declined. A few high school principals in New Delhi have recently shared with the first author their surprise and somewhat disappointment in seeing a marked decline in the number of students from their schools opting for science degrees in colleges. They report that a significant number of students have begun to enroll in commerce classes in their 11th and 12th year in high school. These educators also pointed out the commerce related courses did not even exist in the high school curriculum a few years ago. They were also quick to point out that this was a national trend. No specific numbers were available but the observations of these educators with more than 20 years of experience on the job merit consideration. It is a likely predictor for what is about to happen.

A few studies have looked at the actual enrollments. Garg and Gupta (2003) analyzed the preferences made by high school students during their 11th and 12th year for science versus accounting and economics (known as commerce subjects) for the period from 1992 to 2002. Their finding was consistent with the observations of high school principals in New Delhi. Fewer and fewer students opted for science subjects while more and more chose accounting and economics (see Table 1 below).

Table 1. Priority index values for enrolment in different subjects for CBSE during 1992–2002*

Year	Accounting	Economics	Mathematics	Physics	Chemistry	Biology	Science** (Combined)
1992	84	109	98	97	97	113	101
1993	81	104	97	101	101	117	104
1994	83	97	100	102	102	118	106
1995	85	99	96	103	103	116	106
1996	87	104	94	101	100	114	104
1997	103	102	98	98	98	105	99
1998	109	99	102	97	97	98	97
1999	115	105	99	95	95	94	95
2000	112	100	100	99	99	91	97
2001	109	96	104	101	102	87	98
2002	104	93	106	105	105	82	100

The model and definition of Social Cognitive Career Theory constructs



4. RESEARCH DESIGN

4.1 The Research Questions

The study uses the following questions derived from the key constructs of SCCT model:

- What are the contextual factors that students in India who intend to enroll in the engineering and business program perceive to be facilitative and hindering?
- What are the outcome expectations of students in India who intend to enroll in engineering and business undergraduate program?
- What is the relationship between the primary interest areas of the students in India and their intent to enroll in engineering or business programs?
- What is the relationship between task-specific, coping, and process self-efficacy beliefs and students' intent to enroll in the engineering and business program?
- What are the learning sources from which students in India who plan to enroll in engineering or business program derive their self-efficacy beliefs and outcome expectations?

The responses will be collected from both male and female senior high school students who plan to pursue post-secondary education.

4.2 Sampling

Sampling students in India, a vast country of over 1 billion people is complex. Attempting any type of random sampling of the whole country is impractical even with large material and human resources. Making use of our intimate familiarity with India's educational and cultural system, we have identified a few geographical areas of India that are most likely to capture its high degree of diversity. We have used three criteria to ensure this representation.

First, the high schools in the region should represent the diversity observed in the rest of India. In concrete terms, this implies the presence of public and private schools of varying reputation and selectivity. That is, within the public or government owned schools, some of them should be highly selective academically while others may be less selective. Likewise, there should be high-prestige and lower prestige private high schools.

Second, there should be a range of schools that cater to all economic classes, such as the rich, the middle class, and the poor. The region should have, in a relatively small geographical proximity, a metropolis, a couple of smaller cities, a few well established suburbs, and rural villages. Third, the area should provide multiple educational choices in different undergraduate and graduate subject areas in close geographical proximity to one another.

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Learning Experiences: Career relevant learning experiences throughout life which contribute towards developing a sense of self-efficacy regarding particular career options as well as help the individual develop an understanding of the different outcomes associated with each career option. Learning experiences can develop from four possible informational sources, which are: (1) personal performance accomplishments, (2) vicarious learning, (3) social persuasion and (4) physiological states and reactions associated with the information (Lent et.al, 1996).

Interests: Vocational interests may be defined as patterns of likes, dislikes and indifferences regarding career relevant activities and occupations (Lent and Brown, 2005). .

Choice Goals: Choice goals motivate students and workers to pursue their preferred educational/vocational options (Lapan, Shaughnessy, & Boggs, 1996; Lent, et al., 2003). These are essentially conceived as mechanisms that help people to organize, guide and sustain their actions over time and increase the likelihood that desired outcomes will be attained (e.g., intention to select a given college major). Career plans, decisions, aspirations, and expressed choice are all goal mechanisms. Choice Goals involve specific intentions.

Choice actions: These represent actions taken by the individual in order to realize a goal they have formulated. Actions such as enrolling in a particular training program are designed to implement one's choice. Choice actions are also known as entry behaviors (Lent et.al, 1996).

Performance Outcomes: Performance is broadly defined as including one's level of accomplishments (e.g. course grades) as well as other indices of persistence (e.g. stability of academic major) (Lent et.al, 1996). Performance outcomes involve the outcomes of implementing a certain goal such as receiving a low grade in a science course that a student has chosen to enroll in.