

EMPLOYABILITY OF ENGINEERING GRADUATES **– ISSUES AND CONCERNS**

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I. INTRODUCTION

- There is a wide variation in the attractiveness of the Engineering Profession for prospective students – School – Leavers.
- Industrialized world : Engineering studies are not so popular.
- In the newly-industrializing world (India, China...) they are popular, for the wide choice of careers they offer.
- There is thus a strong nexus between Engineering Education, and Employment and “Employability”.

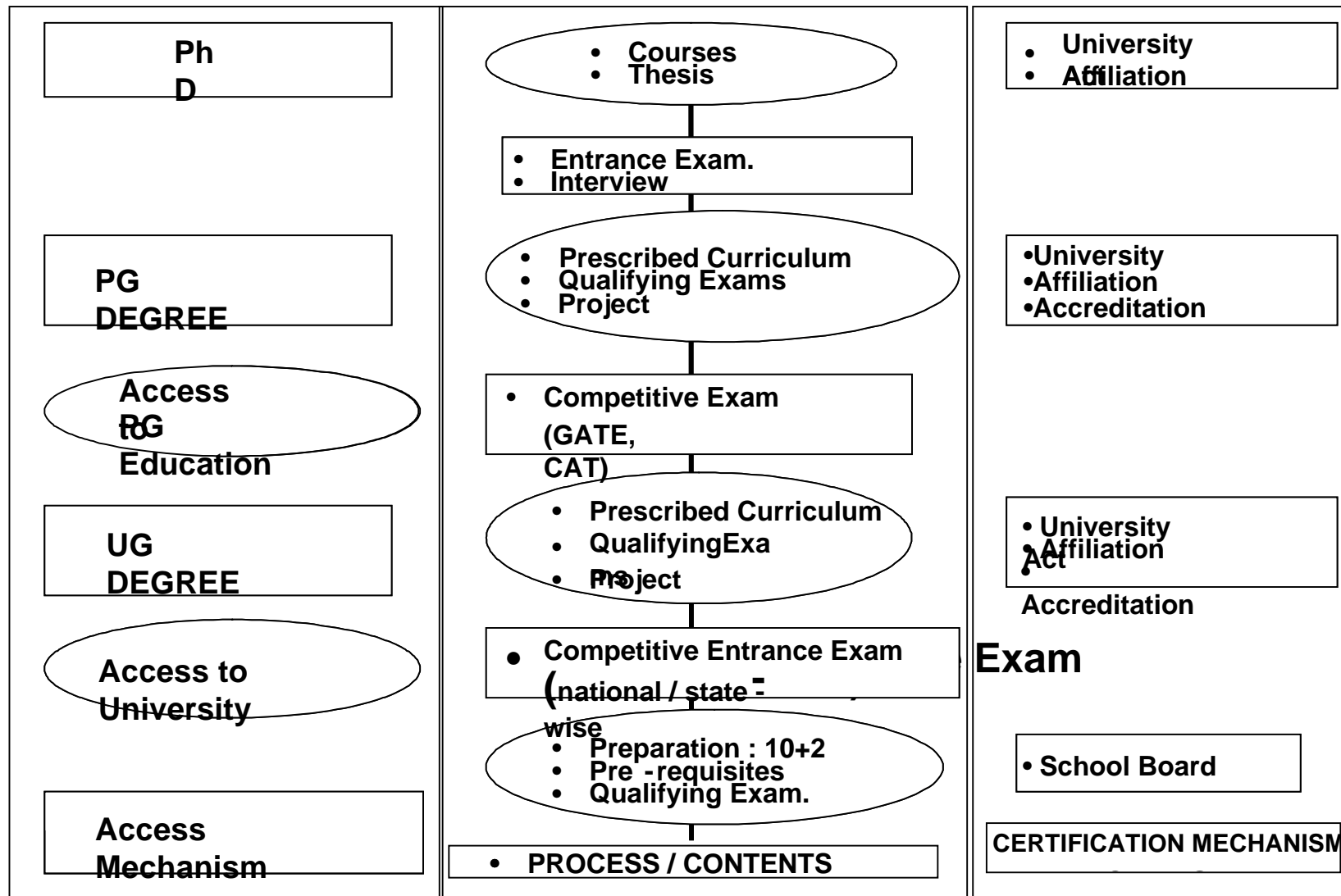


FIGURE 1 STRUCTURE OF HIGHER EDUCATION

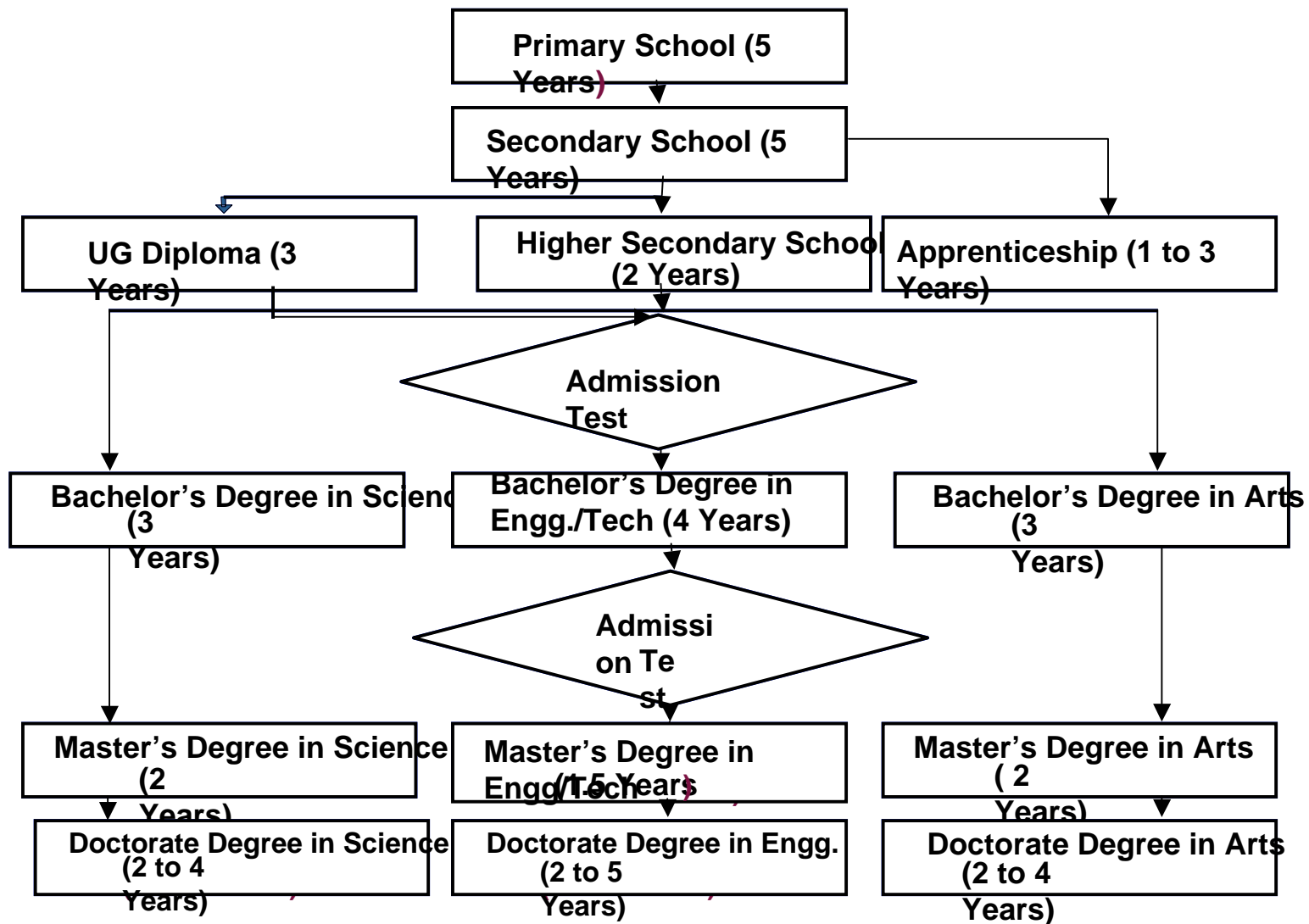
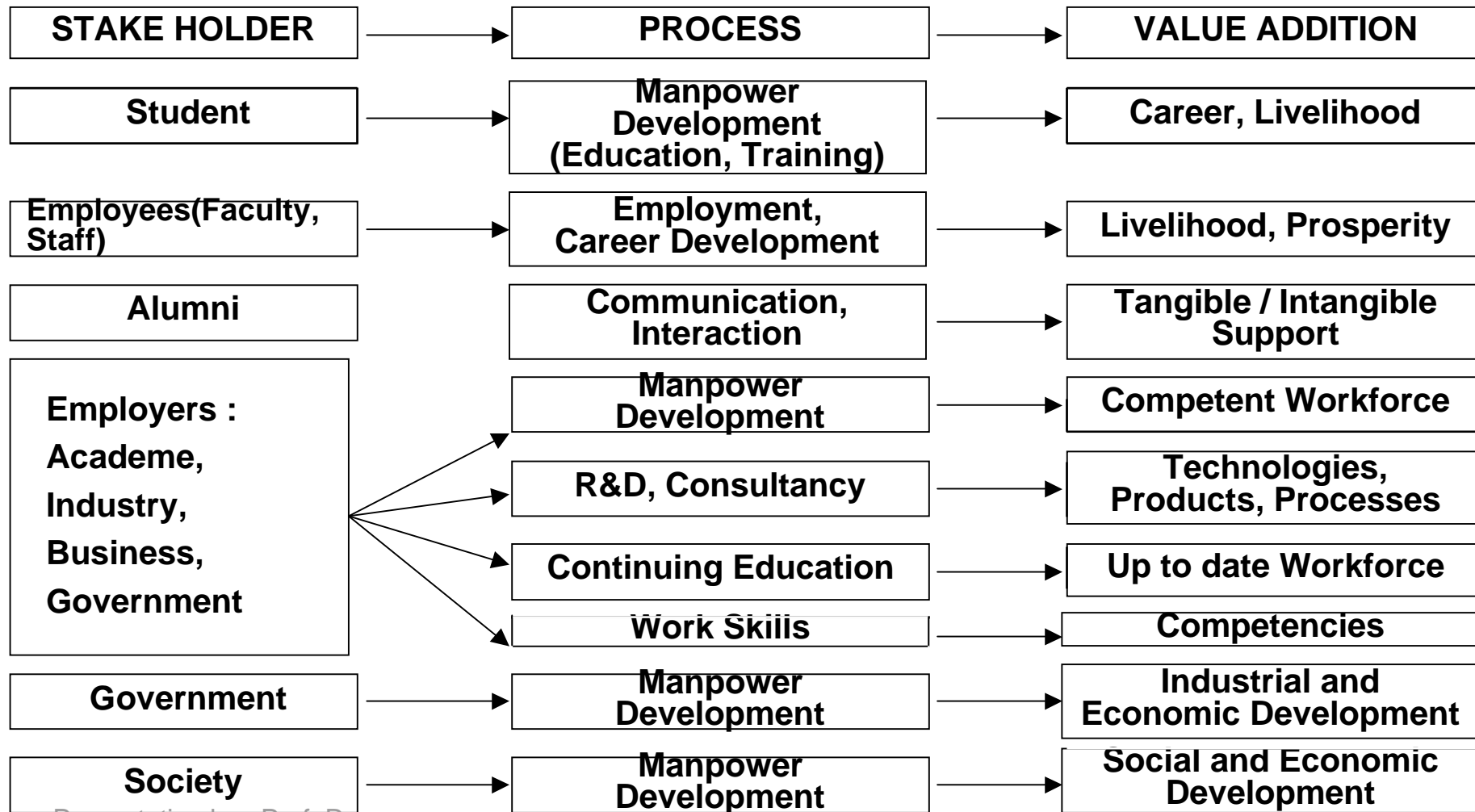


FIGURE 1. THE STRUCTURE OF THE EDUCATION SYSTEM IN INDIA

STAKEHOLDER RELATIONSHIPS IN THE HIGHER EDUCATION SYSTEM



MUTUAL PERCEPTIONS OF INDUSTRY AND THE ACADEME

- Industry and the academe are two important stakeholders in dealing with skills shortages.
- They represent unique and different cultures.
- They have complementary, but not identical perspectives, concerns and strategies.

TABLE I
SOME MUTUAL DISSATISFACTION

INDUSTRY ABOUT INSTUTITONS	SECTOR	INSTITUTIONS ABOUT INDUSTRY
<ul style="list-style-type: none"> ✦ Institutions produce engineering graduates, not practising engineers ✦ Students learn only theory, largely unrelated and irrelevant to solution of industry problems. 	Students	<ul style="list-style-type: none"> ✦ Industry is unreasonable in expecting ‘tailor-made’ products, and must accept responsibility for orienting them to suit their needs.
<ul style="list-style-type: none"> ✦ The faculty possess only bookish knowledge ; they must spend time in industry periodically. 	Faculty	<ul style="list-style-type: none"> ✦ A considerable portion of work in industry is routine, unexciting, and does not involve advanced technology
<ul style="list-style-type: none"> ✦ Too many faculty are chasing problems irrelevant to Indian Industry. 		<ul style="list-style-type: none"> ✦ Indian Industry is more dependent on adopting foreign technology and uninterested in indigenous technology development.
<ul style="list-style-type: none"> ✦ “Out here in the real world” attitude 		<ul style="list-style-type: none"> ✦ “Holier than thou” attitude.
<ul style="list-style-type: none"> ✦ Partial commitment and part-time availability of University Professor is frustrating. 	Overall System	<ul style="list-style-type: none"> ✦ Industrial consultancy is but one of the responsibilities of University Professors. Industry is not bothered about thorough investigation of problems, but demands instant solutions, even if only approximate & incomplete ; this goes against the central theme of R & D as academics perceive it.
<ul style="list-style-type: none"> ✦ Institutions have no appreciation of time-frames ; and are too bureaucratic. 		<ul style="list-style-type: none"> ✦ Industry demands short-cut methods which can not be accommodated. While they put up with foreign consultants, they are inconsiderate toward University Professors.

TABLE II
COMPLEMENTARY ROLES FOR INDUSTRY AND
INSTITUTIONS – I (2)

INDUSTRY STRENGTHS / RESOURCES	SECTOR (Avenues)	INSTITUTIONAL REQUIREMENTS
<ul style="list-style-type: none"> ✦ Stock of practical knowledge and skills ; wealth of experience. ✦ Topics and problems for project / thesis work. 	<div style="border: 1px solid black; padding: 5px; display: inline-block;">STUDENTS</div> (sandwich programs ; lectures by industry professionals)	<ul style="list-style-type: none"> ✦ Industry exposure ✦ Orientation towards industry requirements
<ul style="list-style-type: none"> ✦ Wealth of practical knowledge and experience. ✦ Funds for R & D. ✦ Experts with specialized knowledge ✦ Strategies for enhancing productivity & quality. ✦ Manufacturing facilities; hardware. 	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Faculty</div> (sponsored R & D ; consultancy ; short-term secondments ; lectures by industry professionals).	<ul style="list-style-type: none"> ✦ Lack of awareness and knowledge of industrial practices and needs. ✦ Inadequate funds for R&D. ✦ Lack of industrial orientation in lectures. ✦ Lack of correlation of theory & professional practice. ✦ Lack of awareness of the employment opportunities for students. ✦ Lack of understanding of the role of industry professionals.
<ul style="list-style-type: none"> ✦ Direct contribution to industrial production and economic development. ✦ Funds for support of mutually beneficial activities. 	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Overall System</div> (curriculum development ; endowments ; industry chairs)	<ul style="list-style-type: none"> ✦ Lack of industrial orientation of curriculum. ✦ Inadequate funds for several academic activities.

TABLE II
COMPLEMENTARY ROLES FOR INDUSTRY AND
INSTUTITONS – II (2)

INSTITUTIONAL STRENGTHS / RESOURCES	SECTOR (Avenues)	INDUSTRY REQUIREMENTS
<ul style="list-style-type: none"> ✦ Educating competent manpower. 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Students</div>	<ul style="list-style-type: none"> ✦ Manpower
<ul style="list-style-type: none"> ✦ Academic and sponsored research, consultancy expertise. ✦ Specialized knowledge in the areas of expertise of faculty. 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Faculty</div> <p>(sponsored R&D ; consultancy ; joint projects ; continuing education)</p>	<ul style="list-style-type: none"> ✦ Access to timely R&D results and information. ✦ Solution to immediate problems. ✦ Refresher courses, and state-of-art information and techniques for industry personnel.
<ul style="list-style-type: none"> ✦ Wealth of faculty expertise and R&D facilities. ✦ Library. ✦ External Registration Programs 	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Overall System</div> <p>(curriculum development ; continuing education ; external registration for research degrees ; library).</p>	<ul style="list-style-type: none"> ✦ Industrial orientation to graduating engineers. ✦ Continuing education of industry professionals. ✦ Access to textbooks and journals. ✦ Advanced degrees for industry personnel.

TABLE V
DIFFERENCES IN PERCEPTIONS OF UNIVERSITY AND
INDUSTRY

CHARACTERISTIC	UNIVERSITY	INDUSTRY
1. Values	✳ Altruistic, Scientific	✳ Business, Commercial
2. Activity	✳ Generation and Dissemination of Knowledge and Ideas.	✳ Application of Knowledge for Economic Gain.
3. Objective	✳ Excellence in Academic Activities.	✳ Customer Satisfaction, Profit.
4. Role	✳ Academic philosophy requires keeping up with Theory and Applications.	✳ Corporate philosophy involves new design and manufacturing processes, innovations, software development.
5. Motivation for Learning	✳ Knowledge for its own sake ; Continuous learning to upgrade knowledge	✳ Need-based ; learning as necessary.

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DIFFERENCES IN PERCEPTIONS OF
UNIVERSITY AND INDUSTRY

6. Horizon	★ Long-term	★ Short-term
7. Output	★ Academic Degrees, Publications, Patents	★ Cost-effective Quality Products and Processes.
8. Openness	★ Keen to publish results expeditiously.	★ Keen to keep know-how secret.
9. Attitude	★ ‘Holier than thou’.	★ ‘Out here in the real world’.
10. Process of HRD	★ Education : open-ended process leading to the development of mind ; involves inputs in cognitive and affective domains.	★ Training : specific goal is to impart technical skills ; involves inputs in the psychomotor domain.

ENHANCING EMPLOYABILITY THROUGH COMPETENCY ASSESSMENT

- IT/ITeS/BPO sectors in India:
 - Exponential growth over the past 5 years; CAGR of 40%.
 - Trend expected to continue into the near future
- NASSCOM estimate: in 2009, demand for IT/ITeS professionals: 1.1m
 - Projected shortfall: 250,000
- Dire need: availability of manpower with acceptable “*employability skills*”.

- Important need: a mechanism for competency assessment and career orientation.
- BITES and MeritTrac are coming together to implement a program for:
Enhancing employability through competency assessment.

- The IT/ITeS/BPO sector is characterized by:
transfer of some of an organization's repeated
non-core and core business processes
to an outside provider:
- To achieve cost reductions; and
 - Improve service quality.

SKILLS TESTED IN DIFFERENT TYPES OF ASSESSMENT:

1. Skills Tested in Written Tests:

- Domain Knowledge
- Quantitative Aptitude
- Analytical Skills
- Logical and Critical Thinking Skills
- Verbal Ability/ Proficiency in English language

2. Skills Tested in Group Discussion:

- Communication Skills
- Interpersonal Skills
- Leadership Skills
- Motivational Skills
- Team Building Skills
- Tolerance to Ambiguity
- Divergent Thinking
- Listening Skills
- Presentation Skills
- Analytical / Logical Skills

3. Skills Tested in Personal Interviews

- Attitude
- Domain Knowledge
- Clarity in Thought
- Clarity in Goals
- Presentation Skills
- Communication Skills
- Level of Motivation, etc.

- These assessments are intended to generate quantifiable profiles of the knowledge and skill levels of the graduates.
- They enable the categorization of graduates into:
 - “employable/ recruitable”; and
 - “trainable” populations.
- For the latter set, “customized” training programs may be designed to enhance their employability.

Employability Enhancement Program of “Merit Trac”

- Merit Trac: a skills assessment company that “designs and delivers assessments, to evaluate abilities, skills and knowledge for both corporates and individuals”.

➤ Its **Employability Enhancement Program**

seeks to provide:

- An understanding of the expectations of industry.
- Identification of the employable talent pool.
- Opportunity for this pool to showcase its skill sets to the industry; and
- Detailed feedback to the unemployable talent pool on the skills gap, to facilitate training and orientation.

- Merit Trac seeks to provide answers to the following questions:
- Identification of critical skill sets that render large chunks of talent pool unemployable.
 - How to identify them across colleges.
 - Training initiatives needed to make the entire talent pool employable.
 - Role of various stakeholders in achieving this.
 - How to continuously measure and track progress.

- Merit Trac has conducted its employability tests for 8456 pre-final and final year students, covering 95 engineering colleges, in 2006.
- Test framework:
 - *IT abilities test*: verbal ability, analytical ability, attention to detail.
 - *Spoken English – Communication Skills*: articulation, contextual relevance, grammar.

- *Qualifying criteria*: set at levels which typical IT services companies use for their recruitment processes.
- *Employability figures*:
 - Better for Bangalore (37.69%) than for the rest of Karnataka (23.48%)
 - Enabling ecosystem for employability; higher exposure to industry.

The Recent NASSCOM-McKinsey Study (2005)

“Extending India’s Leadership of the Global IT and BPO Industries”.

➤ This Report relies exclusively on the McKinsey Global Institute Study:

“The Emerging Global Labor Market” –

based on extensive work on :

- Off-shoring
- Global industry restructuring; and
- Impact of MNC investment in developing countries.

- The study focuses on 8 industry sectors:
“automotive, healthcare, insurance, IT services,
packaged software, pharmacy, retail, and retail banking”.
- Analyses the availability of talent pool in
28 low-wage countries, and 8 mid to high-wage ones.

- Also assessed the “*Location Cost Index*” –
a tool for companies to evaluate location attractiveness,
based on 6 groups of criteria:
“labor cost, vendor landscape, market potential, risk profile,
business environment, and quality of infrastructure”.

- Premise I: Any location-insensitive job, such as any task that does not require any “physical or complex interaction between an employee and customers/colleagues”, and any “local knowledge”, has the potential to be globally resourced.
- The study focuses only on :
 - Service sector jobs; and on
 - The demand for low-wage employment from the high-wage countries.

- Premise II: “If you can describe a job precisely, or write rules for doing it, it is unlikely to survive.
- Either we’ll program a computer to do it, or we’ll teach a foreigner to do it”.
- An important finding:
“Off-shore talent potential exceeds high-wage country potential by a factor of *two*”.

- Although the potential supply of talent in low-wage countries is large and growing rapidly, the report identifies *three* factors that set a limit to the proportion of potential job candidates who could successfully work at a foreign company:
- Limited suitability
 - Dispersion of the workforce; and
 - Domestic competition for talent.

- The *three* reasons for the low levels of suitability:
- Lack of necessary language skills.
 - Low quality of significant portions of the educational system, and its limited ability to impart practical skills.
 - Lack of cultural fit, which can be seen in inter-personal skills and attitudes towards teamwork and flexible working hours.

➤ The *MGI Study Notes* list a different set of *five* categories of deficiencies:

- Language issues
- Lack of logical skills
- Limited overall quality of education system
- Limited communication skills/confidence
- Lack of other soft skills (teamwork, energy level, cultural clash).

- For each occupational group, a quantitative as well as a qualitative question were asked:
 - “Of 100 random candidates with the correct degree, how many could you employ if you had sufficient demand for all 100?”
 - What are the main deficiencies of the candidates you turned away?”

TALENT MANAGEMENT

➤ *A talent management system* typically includes four elements:

1. Attracting Talent

- More than money, talented people want to work for:
- An organization they can believe in
 - One they care for
 - One they are proud to work for, and
 - Where the work is challenging and exciting.

2. Keeping/Retaining Talent

- The loyalty of talented people can not be taken for granted.
- The organizations must foster a work environment which encourages their talented workers to continue to stay.

3. Managing Talent

- Getting the best out of talented people is a management skill.
- It includes:
 - Strategically placing them in the right positions where they are not dragged down by routine work.
 - Providing them a setting in which they can produce maximum innovation, and create maximum impact.
 - It is believed that 21C organizations will have Chief Talent officers (CTOs), who will be responsible for: hiring the best, using the best, and keeping the best.

4. Identifying Talent:

- While talents are a scarce resource, they are often an untapped one; organizations fail to use them effectively.
- It is imperative that managements identify the hidden talents of current employees before hiring new talent.

Return on Talent:

➤ Defined as:

$$ROT = \textit{Knowledge generated/Investment in Talent}$$

- ROT measures the payback from investment in people.
- Shows whether management is hiring the right people, and how effectively they are deployed to achieve business success.
- In order to quantify ROT, a price tag must be put on knowledge generated, on the basis of results.

The Emerging Employment Contract

➤ *Jack Welch* described the new employment relationship at GE as a psychological contract:

- Jobs at GE are the best in the world for people who are willing to compete.
- We have the best training and development resources, and an environment committed to providing opportunities for personal and professional growth.

- *Motorola* considers its key resource of competitive advantage to stem from recruiting and retaining the best grads from leading schools in every country in which it operates.
- Recently, it has launched the “*Individual Dignity Entitlement*” (IDE) program to underscore its commitment to employability.

CONCLUDING REMARKS:

“Skills shortages” have many dimensions:

- National
- International
- Manufacturing industry sectors
- Services industry sectors
- Industry vs academe perspectives
- Globalization

GLOBALISATION—DIFFERENCES IN PERCEPTIONS OF DCs AND LDCs

<u>Sector</u>	<u>Developed Countries</u>	<u>Developing Countries</u>
Economy	<ul style="list-style-type: none"> ✓ favorable trading opportunities ✓ expanded markets 	<ul style="list-style-type: none"> ✓ deregulation ✓ enhanced privatization ✓ currency integration
Education	<ul style="list-style-type: none"> ✓ enhanced markets for educational products, processes and services ✓ making up for reduced indigenous demand. 	<ul style="list-style-type: none"> ✓ study opportunities abroad for those who can afford ✓ Competition to local institutions
Employment	<ul style="list-style-type: none"> ✓ leads to erosion of jobs ✓ Competitions from low-wage work force from LDCs 	<ul style="list-style-type: none"> ✓ leads to off-shore jobs ✓ opportunities for short-term employment abroad.