TATA

TATA CONSULTANCY SERVICES

Strategy for Enhancing Quality of Engineering Education

Tata Consultancy Services

Preamble

India needs more top class engineers to support

Innovation in engineering processes

- Creative product development

Faculty requirement of engineering colleges

Build strong and world class graduate schools in engineering leading to research, more PhDs and M.Es.

Preamble contd...

- **Present Situation**
  - A few institutes like IITs together produce about 2500-3000 top class first degree engineers. About 2000 migrate abroad,another 500 opt for Business management.
  - If quality of 50-60 colleges that admit students with 85%+ score at the 10+2 level is upgraded to the level of IITs, it is possible to produce 25,000-30,000 top class engineers.
  - About 5-6 engineering colleges in Maharashtra fall into the category of the above 50-60 colleges.

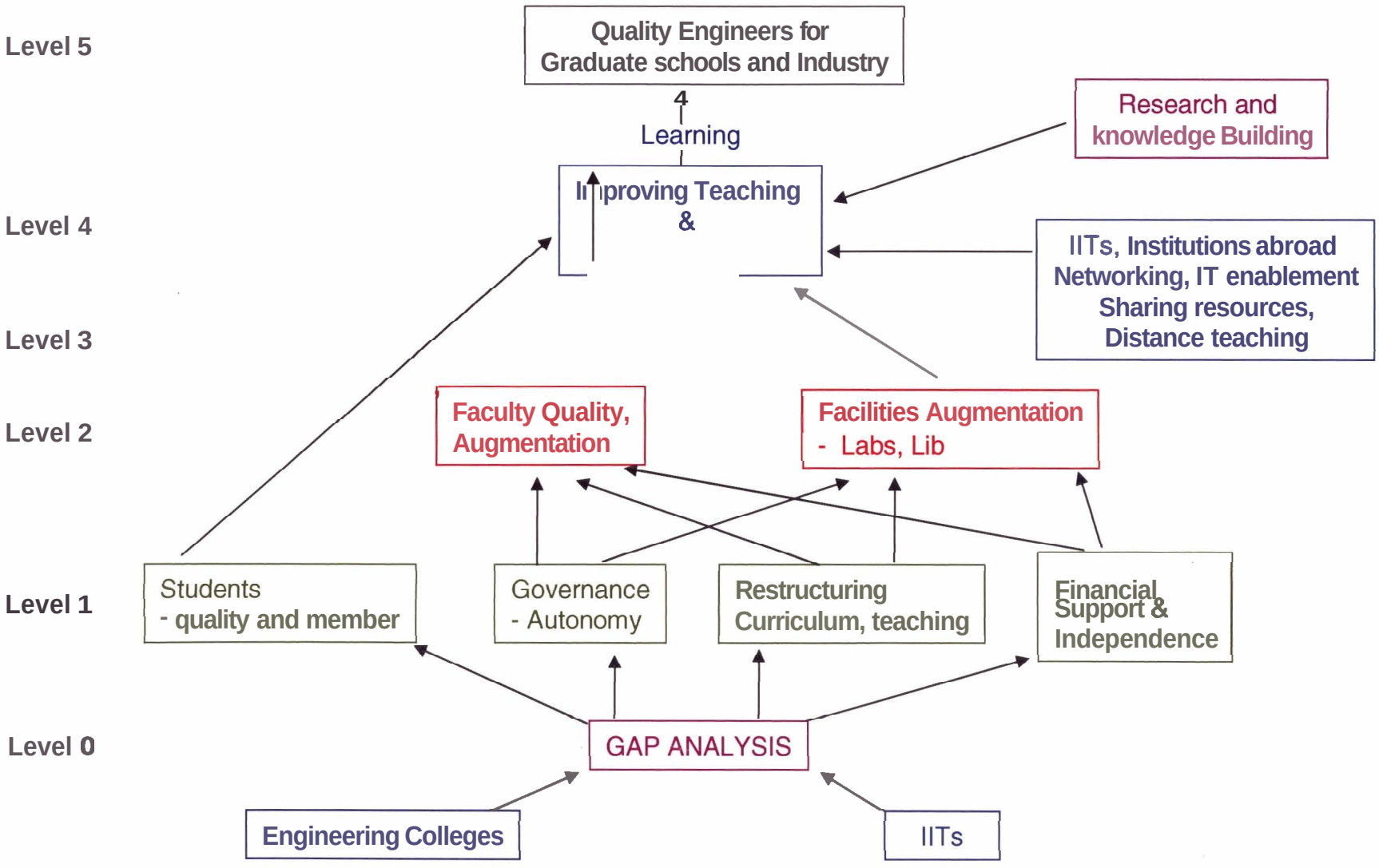
    (Maharashtra has 129 engineering colleges with intake capacity of about 39000 students per year. Quality is a big concern)
  - Situation in other states is similar to Maharashtra

Objective of the Project

- **To identify gaps and enhance the quality of first degree instruction in 3 engineering colleges in the State of Maharashtra to the level of IITs. This will be a prototype.**
- **The first phase will include the following three colleges**
  - **VJTI** and **COE Pune** (two of the oldest colleges with a long tradition of quality education at the first degree stage)
  - **Guru Gobindsinghji COE, Nanded**
- This **prototype** after one year's experience can be extended to other colleges in the **State as well as the Country**

Areas to be addressed

- **Governance and Administrative Issues**
  - Modernization of Administration and Management
- **Financial Issues**
- **Academic Issues**
  - Faculty Development
  - Faculty Collaboration
  - Curriculum Development
- **Electronic connectivity to enable**
  - Networking the libraries and other facilities
  - Interactive Distance Learning in real time


Level 5
Quality Engineers for Graduate schools and Industry
4
Learning
Research and knowledge Building
Level 4
Improving Teaching &
IITs, Institutions abroad
Networking, IT enablement
Sharing resources,
Distance teaching
Level 3
Level 2
Faculty Quality, Augmentation
Facilities Augmentation - Labs, Lib
Level 1
Students - quality and member
Governance - Autonomy
Restructuring Curriculum, teaching
Financial Support & Independence
Level 0
GAP ANALYSIS
Engineering Colleges
IITs

Level-0

- Carry out detailed gap analysis of selected engineering colleges vis-a-vis IITs.
  - Governance
  - Administration
  - Finance
  - Curriculum
  - Facilities
  - Student Selection

Level-1

Student – quality and quantity control

- Ensure high quality student input by offering admission to those students who take the IIT-JEE or some other equivalent tests.
- The number of students admitted to the various disciplines can be made flexible and responsive to post graduate and industry needs
- Maintain reservations – ratios of in-and out-of-state students, reservation for the SC/ST as per State Government policy.

Level-1 contd...

- **Increase Autonomy and Governance**
  - Restructure Governance and Administration to achieve outstanding ranking and image close to IITs.

Level-1 contd...

- **Courses / Curriculum**
  - Initial emphasis on undergraduate program
  - Curriculum to reflect the current and advanced knowledge
  - Structure to review curriculum frequently to obviate obsolescence
  - Introduce a limited number of post graduate courses on the basis of faculty interests, competence and facilities on one hand, and industry needs on the other.

Level-1 contd...

- **Design of Financial Support and Independence**

a) To start with bulk of funds from industry, alumni, international agencies
   - Generation through testing, consultancy, sponsored research and alumni
   - Industry can be made an active shareholder

b) Government Support
   - Enhance the Government grant to the selected colleges by a token Rs.5 crores per year per college for a five year period. Encourage institutions to earn resources by offering to match such earnings, up to a maximum of Rs.5 crores per year.
   - Arrange for low-interest, long-gestation loans and Explore funding from World Bank, Asian Development Bank and European Agencies
   - **Design for Financial Independence**

Level-2

- **Augment number and obtain quality of faculty**
  - Fill up vacant faculty positions through regular appointments as well as by adjunct, adhoc, contract faculty from industry, R&D institutions, overseas Indians on sabbatical, and retired IIT faculty.
  - Create a system of Sabbatical leaves for Faculty
  - Provide resources for the faculty to enhance their knowledge by attending conferences both in India and abroad.

Level-2 contd...

- **Facilities**
  - Improve facilities in tune with curriculum/courses
  - Share resources through effective deployment of IT
  - Co-ordinate investment for books/CDs, journals, and equipment

Level-3

- **IITs**
  - Building Relationships with IITs, other similar institutes here and abroad – teaching curriculum Obtain Distance Learning in Real Time mode
- **Sharing resources**
  - In return provide information on the working of the institute its faculty, etc.
- **Using Information Technology**
  - Build wide bandwidth network for interactive teaching
  - Use IT to facilitate distance teaching from IIT faculty / other premier institutes and for sharing library resources and knowledge of best faculty for various subjects.

Level-4

- Facilitate synergy between research and teaching to make available a larger number of top class engineers

Financial Strategy

- **Increase financial autonomy for selected colleges**
  - Financial autonomy is critical to generate, retain and utilize funds to building a world class institution. Compensate faculty and staff to obtain the best. Equip laboratories and libraries comprehensively with the latest.
- **Provide direct/in-direct financial assistance**
  - Bulk of funds from industry, sponsor agencies, alumni
    - Generation through testing, consultancy, sponsored research and alumni
    - **Industry needs to become an active shareholder**
  - **Recovery from the direct beneficiary**
    - Fee of Financial Assistance in the form of Recoverable Loans – The Role of Banks
  - **Government Support**

Cost of Education – Comparative Statistics

	VJTI	IITs
Total Income	10 crores (Sources of income: 100% deficit by State Govt for UG courses. Block grant from Central Govt for PG)	97 crores (revised estimate 2000-01) (Sources of Income: Block grants from central Govt (80%). Rest 20% from self-generation – research, consultancy, alumni)
Tuition Fee per student per year	Rs.10,000	Rs.29,000
Total number of students (UG+PG)	3000 (incl Post SSC)	4173
Approximate Cost of Education per student per year for undergraduate	Rs.33,000	While cost per student works out Rs.1.85 lakhs, for undergraduate cost is around Rs.85,000.

Potential Recovery from Students

- If the selected colleges are upgraded to the level of IITs they should be able to charge a fee of approximately Rs. 1 lakh per year.

  College will have 2000 students for 4 years. This would translate to fees equivalent to Rs.20 crore per year.

Features of Prevalent Loan Scheme

- Approved by **RBI/Finance** Ministry in 2001
- No margins for loans less than **Rs.4** lakhs and charge a 15% margin for loans above Rs. 4 lakhs
- Repayment timeframes of the order of 5-7 years.
- The interest rate for loans less than Rs. 4 lakhs should be less than the prescribed lending rate
- No guarantees / securities are required for the same
- A number of banks have volunteered

Need for a Special Loan Scheme

- The loan proposal needs to be aligned with the larger goal of improving quality of engineering education
- Total funds to be earmarked for loans for a college will be about Rs.20 crores per year (80 crores over 4 years). This will become a self-sustaining pool in a span of 7 years.

Key Considerations

1. **Education loan should be available to all the students selected by the college**
2. **The terms should be not burdensome and requiring minimum documentation. Suggest that**
   - a **longer time frame for repayment –** from 7-10 years

     a **reasonable lower interest rate** of 5 or 6 percent during the period of study considering that **this type of education and infrastructure build actively**
   - The **repayment amount may vary with the earning potential** of the individual

Key Considerations contd...

3. Money would be transferred directly to college
4. The responsibility for repayment will rest on the students themselves. " Burden on Beneficiaries"
5. If a student wishes to pursue postgraduate education, their loan should be suitably restructured.

Risk and Societal Aspects

- Recovery risk is minimum since good quality of education would ensure better opportunities either in career and upward mobility or post graduate studies.
- Banks would participate in solving a major societal problem in technological advanced higher education in engineering discipline.

Approximate working – 5% interest

- Loan of Rs. 1 Lakh every year for 4 years – Principal amount of **Rs.** 4 lakhs at the time of graduation
- Interest – 5 % per annum
- Repayment – starting from end of **5th** year for a period of ten years. Graded repayment, low for the first 3 years, more for next 3 years and still more over next 4 years.
- Total outflow (loan amount including interest) at the end of **4th** year – **Rs.4,50,000**
- Total inflow at the end of **15th** year – **Rs.6,07,342** to service the entire loan with interest.

Approximate working – 6% interest

- Interest – 6% per annum
- Repayment – starting from end of 5th year for a period of ten years, graded repayment
- Total outflow (loan amount including interest) at the end of 4th year – Rs. 4,60,000
- Total inflow at the end of 15th year – Rs. 6,56,655 to service the entire loan with interest.

Equipment and other Assets
(except buildings and property)

- Objective is that an Engineering Institutes i.e.envisaged should have the equipment with latest and advanced technology
- Estimated maximum requirement about 5 crores per annum
- This amount will be either accommodated in the 20 crores that the institute will get or raised through other avenues.
- Equipment will be considered on lease to the institute for 4 years. Thereafter it will be returned to a body to be structured as Leasing Foundation
- Equipment returned depending on its remaining useful life will be given to Diploma colleges and such institutions.

Thus Engineering College at any point of time will have the latest equipment and facilities.