Chapter 1: Introduction

Overview:
India, as a nation, is a developing country. It is well understood by the society that, Technical Education will offer us an opportunity to grow wealth. Establishing an engineering institution has always been an expensive proposition. The cost of establishing any technical institution is high. Therefore, to avoid expenditure of public Funds, the state of Karnataka, followed by the state of Maharashtra adopted a policy to allow private trusts to establish technical institutes in the state. The other states have also followed the suit subsequently.

Majority of Indian population belongs to economically low or middle income group and therefore the parents of this group think that technical education would give their wards / children a job opportunity immediately after completing the education.

The economical condition of the country reached the lowest ebb in 1993 and the Government decided to open up their financial policies. This is globalization. Our markets became open and started flourishing. This allowed technical education to expand at an exponential rate and the students intake at national level started increasing from a few thousand to lacs. In the last fifteen years in engineering programs it has grown up from 1 lac to 18 lacs.

In order to ensure adequate standards of technical education, All India Council for Technical Education (AICTE) become the statutory body by an Act of Parliament in 1987. AICTE started enforcing norms and standards for technical education in the country. Till this time, the post graduate education in engineering and technology was mainly restricted with IITs or NITs and few other institutes of higher learning. To meet international standards, AICTE enforced a minimum qualification for teaching position to be a PG degree in engineering and technology. The institutions were also required to maintain a teacher to student ratio at 1:15, at under graduate level. Therefore when the intake was increasing, paucity of qualified teachers become a big challenge.

The curriculum for all these institutions has been stipulated by their affiliating universities which are established by the state governments. The curriculum to meet the requirement of modern day industry in order to compete with the globalized market. This curriculum should get updated at the speed of market development and
therefore requirement of teachers for teaching such advanced subjects/courses becomes an additional challenge.

Engineering colleges were setup initially in major cities but were also developed in the district places as well as rural parts of the country. AICTE has stipulated norms for infrastructure to be made available at the time of opening a new Institute or to run the existing Institute. It includes land, classrooms, laboratories, seminar halls, workshops, library, equipments, books etc. Every institute has to first buy a land, set up infrastructure and then open or run Institute. AICTE also insists on appointment of Principal and faculty. Hence the cost of setting up of an engineering institute has became very high and management opened institutes in rural part for want of cheaper land. However student acquires technical knowledge only through a teaching learning process. Most of the institutions concentrated on teaching just enough for the students to pass in the examination. The qualified engineers were made available to the market. Industry wants these engineers to apply their knowledge to solve problems of the society so that their product becomes saleable and profitable. Therefore industry feels today that graduates are available but they are not employable.

The management of most of the new institutions faced a problem of attracting students for admission. The students apply for and chose an institution, whether it is a government or a private institute, through a single window process of admission implemented by the state government.

The earlier research has indicated that the students choose the institute which offers employment on campus as a first priority and also look at availability of qualified faculty and university results of examination for a particular institute.

As the technical education in the country is a cost based education, the management of private unaided institution have to ensure that, they receive enough students to get adequate tuition fees to run the institute and therefore it has become very important for the management of every institution to setup a mechanism by which proper teaching learning process is set up to make the students employable irrespect of the quality and potential of the students admitted to their institute, and with teachers whichever are available to them.

The research is focused on identifying the qualities of teacher for enhancing academic performance of students in University exam, recruiting teacher of a right attitude and training them to imbibe with necessary qualities as well as to establish a monitoring mechanism for better teaching learning process.
1.1 Technical Education and National Development

Science and technology plays vital role for economic and social development of nation. All developed countries in the world have acquired wealth and better living conditions of their population due to development and application of Science and technology. India being developing country also realized the importance of technical education as tool for economic development and improving the quality of life of the people in country.

The report of committee constituted by planning commission on India vision 2020 in December 2002 is based on national unity, security of food and peace, education & jobs for all, technology& infrastructural development, globalization, good governance & work values. It highlights important issue of employment and education and recommends that employment to be considered as a constitutional right of every citizen of India. Education is the basic foundation of vibrant democracy, to achieve higher rate of productivity, to generate wealth & employment opportunities. Technical education offered by large number of engineering colleges need to be upgraded to quality standards as good as to the level of Indian Institutes of Technology (IITs). [1]

1.2 Technical education in India: Pre Independence

In the world, technical education was started after invention of Steam Engine by James Watt (1780). To name a few technical institutes are Jon Anderson at Glasgow, London, now known as Royal Technical College (1790), Ecole des Traveaux, France, now known as Ecole Polytechnic (1794), Bowdoin College, New York, USA (1823). After the battle of Plassey in 1754, British movement changed from traders to colonizers. To rule the country, it was a need of the time to understand topography of India through civil survey and therefore, first survey school in Chennai (1794) was started, now known as Engineering College, Guindy. Also to train the person for civil and other Engineering activities, additional three colleges i.e. Roorkee (1847), Pune (1854) and Sibpur (1856) were set up. Other prominent institutions, IISc by House of Tata (1908) and Banaras Hindu University (BHU) by Pandit Madan Mohan Malaviya (1916) were established. Finally, twenty four Engineering colleges with 2570 intake, out of which six institutes were offering P. G. with intake 70, were available at the time of independence.

Various commissions were set up for framing policies for development of higher education such as Indian University Commission (1902), Education Policy (1913),...
Indian Industrial Commission (1916), Central Advisory Board of Education (CABE – 1943), Resolution to set up All India Council for Technical Education (AICTE – November,1945), Sarkar Committee (1945).[2]

1.3 Technical education in India: Post Independence
Existence of five IIT’s at Kharagpur (1951), Bombay (1958), Madras (1959), Kanpur (1960) and Delhi (1961) is the outcome of recommendations of Sarkar committee. In due course, up to 2009, Government of India established 15 new IIT’s. The next tier of institutions, 20 NIT’s (old REC’s), were established followed by a large number of State Government Engineering Colleges as tier three. Few of them are autonomous and others are affiliated to university. In 1983, the scenario changed across India, after obtaining the permission by Central Government to open up Private Un-aided Self Financed Engineering Colleges in various states.


1.4 Structure of technical education in India
The present structure of engineering education in India is through:
A) Category: Universities and Institution of national importance created by Act of parliament are
   i. Central Universities and Deemed-to-be-Universities [These Universities are created by the MHRD through gazette notification]. All colleges under this are autonomous to decide curriculum, conduct examination and award degree All IITS viz Indian Institutes of Technology [IIT]. Indian Institutes of Scientific Education & Research [IISER]. Indian Institutes of Management [IIM].
   ii. In each of these IITS every department is autonomous and is free to decide curriculum, conduct examination and degree is awarded by IIT/Institute
B) Category: universities created by the Act of State Legislature are:
I) State University:
   i. Affiliated colleges: in which all colleges have to teach to their student common curriculum prescribed by university, and have to appear common examination conducted by university, results are declared by university and degree is awarded by university
   ii. Affiliated but Autonomous: are free to decide curriculum, conduct examination and degree is awarded by affiliating university.

II) Private University. [3]

1.5 National Policy of Higher Education of India

In 1948, the then first president of India, Honorable Late Sarvapalli Radhakrishnan, has expressed that higher education should be inclusive, accessible and should reach to everyone, fulfill needs and expectations of a common person. Education is a strong medium to bring social and financial changes in the country. Ultimately, higher education needs to satisfy national objectives such as enhancement in productivity, modernization, national unity, social and moral. [4]

National Policy of higher education of India, has elaborated the exact status of higher education. The report has mentioned some serious drawbacks and challenges that higher education is facing. Central and State Government has implemented the recommendations of NPE partially.

In India, if we want to rank technical institutes based on quality and image they carry, there is a thumb rule which says that IIT, IIM, IISc are the top most institutes followed by NIT’s. At the second level, centrally funded autonomous institutes/universities followed by the state universities and lastly affiliated institutes and private universities. After passing 12th, majority of top meritorious students joins such top quality institutes and remaining students gets an admission, based on their merit, to affiliated or other institutes.

It is necessary to transform higher education to become capable and competitive to global education. The quality of higher education will be improved only if institutes/universities will establish and fulfill those quality benchmarks/criteria which are essential to achieve global recognition. An apex body, UGC, decides national policy on growth, funding and monitor standards as well as quality for higher education. In addition to this, the professional councils monitor quality of programs of higher education viz. NAAC 1994, AICTE 1987, NBA 1994, National Council of Teacher Education (NCTE Act) 1987, Medical Council of India 1934, Dental Council of India

1.6 Role of All India Council for Technical Education (AICTE)

All India Council for Technical Education was set-up in November 1945 as a national level Apex Advisory Body in order to ensure adequate standards of technical education. As per National Policy of Education (1986), AICTE become the statutory body by an Act of Parliament in 1987. AICTE started enforcing norms and standards for technical education in the country and conducted survey on the facilities of technical education and to promote development of technical education in the country in a coordinated and integrated manner.

AICTE becomes statutory authority for planning, formulation and maintenance of norms and standards, quality assurance through accreditation, funding, monitoring and evaluation, maintaining parity of certification and awards. Technical education in areas of Engineering, Technology, Architecture, Town Planning, Management, Pharmacy, Applied Arts and Crafts, Hotel Management and Catering Technology etc. at different levels are in the purview of AICTE. [6]

1.7 Role of Directorate of Technical Education (DTE)

The role of the Directorate of Technical Education at state level is to maintain and enhance the standards of quality of technical education by adhering and implementing norms of AICTE. It also has responsibilities at state level, of framing policies, establishing and developing government institutions, guiding, supervising the aided and un-aided private institutions, interacting with industry and national level institutions, co-coordinating with other departments of state and central government, to achieve perspective plan for betterment of society at large.

1.8 India Vs Other countries – Engineering Education

Study was carried out for comparison of engineering education institutions in India with other prominent countries at international level in 2013. [7]
Table 1.1 India Vs Other countries – Engineering Education

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Country</th>
<th>Number of Institutions</th>
<th>Number of students per institution</th>
<th>Total number of students</th>
<th>Number of faculty per institution</th>
<th>Faculty: Student ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USA</td>
<td>359</td>
<td>2213</td>
<td>794467</td>
<td>41053</td>
<td>1:20</td>
</tr>
<tr>
<td>2</td>
<td>UK</td>
<td>115</td>
<td>1275</td>
<td>146625</td>
<td>21475</td>
<td>1:7</td>
</tr>
<tr>
<td>3</td>
<td>Japan</td>
<td>227</td>
<td>2128</td>
<td>483056</td>
<td>26056</td>
<td>1:19</td>
</tr>
<tr>
<td>4</td>
<td>China</td>
<td>572</td>
<td>7331</td>
<td>4193332</td>
<td>283440</td>
<td>1:15</td>
</tr>
<tr>
<td>5</td>
<td>Brazil</td>
<td>561</td>
<td>920</td>
<td>516120</td>
<td>34949</td>
<td>1:15</td>
</tr>
<tr>
<td>6</td>
<td>India</td>
<td>3393</td>
<td>445</td>
<td>1509885</td>
<td>62948</td>
<td>1:24</td>
</tr>
<tr>
<td>7</td>
<td>Russian Federation</td>
<td>482</td>
<td>3302</td>
<td>1591564</td>
<td>107529</td>
<td>1:15</td>
</tr>
</tbody>
</table>

Ref: International Comparative Study – “Engineering Education in India 2013”

It is observed that, India has the greatest number of institutions as compared to other countries of the world, but engineering students per institute as well as number of teaching faculties per institute is very much less. As per AICTE norms, the faculty to student ratio at undergraduate and post graduate levels is 1:15 and 1:12 respectively. At present, in India, faculty-student ratio is 1:24 which indicates acute shortage of engineering faculty not only in terms of quantity but also quality. On an average Ph.D. qualified faculty is not more than 20%. [5][8]

As per National Knowledge Commission report, teaching profession is on the least priority of engineering graduate. Due to the shortage of faculty, many engineering institutes are forced to recruit fresh engineering graduates as teachers with no prior training or aptitude for teaching. These fresh recruits need training in pedagogy as well as knowledge improvement. [9]

**1.9 Development of Engineering Education after 1983**

In 1983, Government of India permitted to open private un-aided self financed professional institutes. After 1990, the spirit of globalization was responsible for industrial growth and competition resulting in boost in demand of technical manpower.
Table 1.2 Growth of intake in AICTE approved Institutions

<table>
<thead>
<tr>
<th>Year</th>
<th>Intake Engineering</th>
<th>Intake Polytechnics</th>
<th>Intake Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>653290</td>
<td>417923</td>
<td>1071213</td>
</tr>
<tr>
<td>2008-09</td>
<td>841018</td>
<td>610903</td>
<td>1451921</td>
</tr>
<tr>
<td>2009-10</td>
<td>1071896</td>
<td>850481</td>
<td>1922377</td>
</tr>
<tr>
<td>2010-11</td>
<td>1314594</td>
<td>1083365</td>
<td>2397959</td>
</tr>
<tr>
<td>2011-12</td>
<td>1485894</td>
<td>1117545</td>
<td>2603439</td>
</tr>
<tr>
<td>2012-13</td>
<td>1761976</td>
<td>1212612</td>
<td>2974588</td>
</tr>
<tr>
<td>2013-14</td>
<td>1804353</td>
<td>1177918</td>
<td>2982271</td>
</tr>
<tr>
<td>2014-15</td>
<td>1903722</td>
<td>1308008</td>
<td>3211730</td>
</tr>
</tbody>
</table>

Source: AICTE Process Handbook 2015-16

1.10 Status of PhD and Research in Engineering and Technology

It is proven all over the world that, the research output of an academic institution is significantly dependent on the number, quality and dedication of its PhD research scholars and faculty available with institute.

Record shows in India, First PhD’s in Engineering Discipline at University in Year are: Chemical Engineering Bombay 1940, Metallurgical Engineering BHU 1957, Electrical Engineering IIT, Kharagpur 1959, Civil Engineering IIT, and Kharagpur 1960.

The table 1.3 shows Projected Shortfall of Faculty with PhD Degree in Engineering

Table 1.3 Shortage of PhD’s

<table>
<thead>
<tr>
<th>Year</th>
<th>Approved Intake</th>
<th>Faculty Required</th>
<th>Required Ph.D’s</th>
<th>Available Ph.D’s</th>
<th>Shortage of Ph.D’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-07</td>
<td>572214</td>
<td>152590</td>
<td>50863</td>
<td>9387</td>
<td>41466</td>
</tr>
<tr>
<td>2007-08</td>
<td>658046</td>
<td>175479</td>
<td>58493</td>
<td>10807</td>
<td>47686</td>
</tr>
<tr>
<td>2008-09</td>
<td>758752</td>
<td>201801</td>
<td>67267</td>
<td>12428</td>
<td>54839</td>
</tr>
<tr>
<td>2009-10</td>
<td>870265</td>
<td>232071</td>
<td>77357</td>
<td>14292</td>
<td>63065</td>
</tr>
<tr>
<td>2010-11</td>
<td>1000805</td>
<td>268881</td>
<td>88900</td>
<td>16436</td>
<td>72524</td>
</tr>
</tbody>
</table>

Source:http://shodhganga.inflibnet.ac.in/bitstream/10603/11039/10/10_chapter%203.pdf

It is expected that the faculty required with PhD qualification for the year 2010-11 in Engineering is 88,900. But the available PhD’s are 16,436 only, resulting in a shortage of 72,524.
1.11 Profile of Maharashtra state

Maharashtra is the third largest state in India both in area and population. The state is bounded by the Arabian Sea in the West, Gujarat in the North West, Madhya Pradesh in the North and the East, Andhra Pradesh in the South East and Karnataka and Goa in the South.

The state of Maharashtra has an area of 307,713 sq. km. and has a population (as per census 2011) of 11.2 crore as compared with India (121.01 crore). There are 37 districts, 358 blocks and 43711 villages. The State has population density of 314 per sq. km. (as against the national average of 312). The decadal growth rate of the state is 22.73% (against 21.54% for the country) and the population of the state continues to grow at a much faster rate than the national rate. [10]

Source: Census of India 2011

Gross Enrollment Ratio (GER) and share of technical education

The economy and development of nation depends on main controlling factor such as population, culture of the people, agriculture, policies of government, educational system, industrial growth and infrastructural facilities available.

India is the second largest in the world in terms of population, but higher education has not reached to all. Majority of population is from rural area where GER is 11-13% as compared to GER (19-20%) of urban area. Gross Enrollment Ratio (GER) of higher education in 2011-12 was 17.9% which is now targeted to 25% in 2017, as per the 12th five year plan.

Report on system of education in India based on the data for 2003-04, distribution of GER across programs was 45% in Arts, 20% in science, 18% in commerce and management and 17% in professional courses. Based on the census records 2011-12,
the total population of Maharashtra was 11.23cr. The Estimated population between
the age 18-23 years was 1.30cr. The Enrollment in higher education as per economic
survey was 0.24cr. And the estimated GER of Maharashtra was 18.35%. The target
for GER of higher education in Maharashtra by year 2020 is 35%. As per global
competitiveness report 2011-2012 by Word Economic Forum, India ranks 87 out of
142 countries in higher education. The GER of all developed countries in the world is
much higher than GER of India.
Table 1.4 Gross Enrollment Ratio of developed countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Rank</th>
<th>Gross Enrollment Ratio - Higher Education (%)</th>
<th>Share -Technical Education (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>1</td>
<td>94.4</td>
<td>24.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>2</td>
<td>71.1</td>
<td>18.5</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3</td>
<td>49.4</td>
<td>14.8</td>
</tr>
<tr>
<td>Singapore</td>
<td>4</td>
<td>63.6</td>
<td>---</td>
</tr>
<tr>
<td>Canada</td>
<td>12</td>
<td>62.3</td>
<td>---</td>
</tr>
<tr>
<td>U.S.</td>
<td>13</td>
<td>82.9</td>
<td>11.0</td>
</tr>
<tr>
<td>China</td>
<td>58</td>
<td>24.5</td>
<td>36.1</td>
</tr>
<tr>
<td>India</td>
<td>87</td>
<td>13.5</td>
<td>---</td>
</tr>
<tr>
<td><strong>Maharashtra</strong></td>
<td>---</td>
<td><strong>18.35</strong></td>
<td><strong>22.0</strong></td>
</tr>
</tbody>
</table>

*Source: Perspective Plan, DTE, Maharashtra*

**Development of Engineering Education in State of Maharashtra**

Table 1.5 shows the journey of engineering education in the state of Maharashtra from
1978 to 2014. This information is referred from
http://www.dtemaharashtra.gov.in/approvedinstitutes/CMS/Content_Static.aspx?did=4
0

Table 1.5 Increase in intake capacity of Technical Education in Maharashtra

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Type of Courses</th>
<th>Year</th>
<th>No. of Institutes</th>
<th>Sanctioned Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Post Graduate in Engineering &amp; Technology</td>
<td>1978</td>
<td>9</td>
<td>584</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1988</td>
<td>11</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1995</td>
<td>14</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000</td>
<td>15</td>
<td>770</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2005</td>
<td>41</td>
<td>2789</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2010</td>
<td>88</td>
<td>6081</td>
</tr>
</tbody>
</table>
Perspective Plan of Government of Maharashtra

In 2012, Directorate of Technical Education, Maharashtra proposed the perspective plan of Technical Education based on Vision 2020. It includes plan of expansion, inclusiveness, quality and research, role of ICT in technical education and mechanism for monitoring and evaluation of quality of the institute.


The projected intake capacity of technical education in Maharashtra is based on three criteria such as international benchmarking, industrial demand and social development perspective.

Table 1.6 Projected Intake Capacities in Technical Education

<table>
<thead>
<tr>
<th>Year</th>
<th>2015-16</th>
<th>2016-17</th>
<th>2017-18</th>
<th>2018-19</th>
<th>2019-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake</td>
<td>467725</td>
<td>496617</td>
<td>527744</td>
<td>561308</td>
<td>607954</td>
</tr>
</tbody>
</table>

Passing Rate: On the other hand the statistics depicts the number of students actually admitted and passed in degree and diploma from the academic year 2000 to 2008.
Table 1.7 Students Academic Performance

<table>
<thead>
<tr>
<th>Year</th>
<th>Degree</th>
<th>Diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitted</td>
<td>Passed</td>
<td>% result</td>
</tr>
<tr>
<td>2000</td>
<td>40464</td>
<td>19695</td>
</tr>
<tr>
<td>2003</td>
<td>55067</td>
<td>33012</td>
</tr>
<tr>
<td>2005</td>
<td>50568</td>
<td>39232</td>
</tr>
<tr>
<td>2008</td>
<td>60928</td>
<td>42537</td>
</tr>
</tbody>
</table>

For degree, it is observed that passing ratio has increased from 48% (2000) to 70% (2008) while for diploma, it has decreased from 66% (2000) to 50% (2008).

Qualification and Teacher Student Ratio: Teacher–Student ratio for degree and diploma, in 2008 was 1:19 with Qualifications as 44% Post Graduates, 32% Under Graduates, PhD 5% And Other 19%.

Graph 1.1 Qualifications of Faculty

Campus Placement: From employability perspective, the comparison indicates the campus placement of graduates passing out from various universities of Maharashtra is significantly less than renowned universities across the globe.

Table 1.8 Teacher-Student Ratio and Campus Placement comparison

<table>
<thead>
<tr>
<th>International Benchmark</th>
<th>Harvard University</th>
<th>Boston University</th>
<th>Cambridge University</th>
<th>Maharashtra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty-Student Ratio.</td>
<td>1: 6.7</td>
<td>1:4</td>
<td>1:11.7</td>
<td>1:19</td>
</tr>
<tr>
<td>Placement Rate</td>
<td>83%</td>
<td>82%</td>
<td>95.2%</td>
<td>44%</td>
</tr>
</tbody>
</table>

The immense growth in intake and institutes in Maharashtra was observed after 1983.

1.12 Challenges to Management of Private Self Financed Engineering Institutes:
In the state of Maharashtra, many private charitable trusts who are willing to impart technical education and would like to contribute to the national development, have established their institutes in rural places instead of urban places. This is mainly to reduce the investment required for purchase of land as per AICTE norms. While
establishing the institute and imparting the technical education, management faces the following challenges:

a) Admissions: Although the charitable trusts establish engineering institutes, they have to be self sustainable. The income to such an institute is only the fees charged to the students. The admissions of affiliated (private and government) institutes to the aspiring students are offered through a single window system by the state government. It has been found that, it has become a major challenge to newly opened institutes as described in section 5.1.1 of this thesis.

b) Administration: Absence of awareness to manage engineering institutes which are professional institutes and are completely different from other educational institutes like schools, junior and senior colleges, especially because of stringent norms stipulated by AICTE. Further operational issues like transport facility for students, water and electricity supply, ongoing construction, local issues and political environment, internet connectivity, skilled manpower for timely repair and maintenance of infrastructure, identification of vendors for supply of quality equipment and library books, hostel and canteen facility.

c) Academics: Recruitment of qualified teachers, retention of good teachers, training of faculty, lack of experienced faculty, development of laboratories and library, time table management due to dependability on local transport, frequent changes in time table, difficulty in identifying extra time beyond institute hours for value added inputs to students, understanding capacity of available students, medium of instruction in English, inadequate industry institute interaction for recruitment/placement.

d) Financial Management: Insufficient funding for various additional facilities, fund management due to vacancy during admission, collection of 100% fees from admitted students, admission cancellation, and large failure rate of students.

e) To follow the norms and conditions prescribed by AICTE, DTE, and University etc.

f) Improvement in teaching learning process

g) Attract job offers through campus placement
1.13 Rationale for the study

Majority of engineering institutes are in affiliating pattern. To maintain quality in such affiliating institutes where design of curriculum, conduction of examination, declaration of result as well as award of degree is under control of university. These institutes’ role is to implement the curriculum. The authorities like AICTE, DTE, University expects implantation of prescribed norms regarding infrastructure, staff recruitment, facilities, finance, equipment as per sanctioned intake capacity from self financed private institutes. The other expectations of government authorities are:

- Enhancement in higher GER of technical education particularly in rural areas
- Institutes must admit the students through single window system prescribed
- Institute must be accredited as and when it become eligible for the same

On the contrary, the self financed private institutes in rural areas are facing following issues:

- Students and parents prefer well established institute in city rather than rural place.
- Large number of vacant seats at the time of admission which affects on economic condition of the institute
- Academic Quality of students admitting in such institutes is poor.
- Shortage of qualified and experienced faculty
- Staff Training to implement effective teaching learning process

After understanding importance of technical education in National Development, role of AICTE, DTE, status of engineering education in India as compared with other prominent countries at international level, growth of Engineering Education after 1983, Status of number of PhD and Research in Engineering and Technology, it was essential to study situation of Maharashtra state in context to Gross Enrollment Ratio (GER) and share of technical education, growth of Engineering Education, number of Engineering Institutes located in Urban and Rural Area, Perspective Plan of Technical Education based on Vision 2020 of Government, projected intake capacity of technical education in Maharashtra, Passing Rate, Qualification and Teacher Student Ratio, Campus Placement. Based on the above information, it was possible to define rational behind study.

The earlier evidences insist that for fast development of nation, it is preferred to have higher GER in education, particularly in technical education. In view of this, growth
of engineering institutes is a necessity as per policies of government and AICTE over the period. Establishing engineering institutions has always been an expensive proposition. State of Maharashtra adopted a policy to allow private trusts to establish technical institutes in the state. It is equally important that all such institutes must maintain quality standards as prescribed by the authorities.

Technical education has expanded at an exponential rate and intake at national level has grown up to 19 lacs in engineering and 13 lacs in polytechnic. AICTE started enforcing norms and standards for technical education in the country. Majority of Indian population belongs to economically low or middle income group and thought that, technical education would give their wards / children immediate job opportunity.

Therefore large number of student preferred to take engineering education as first choice. Limited seats were available in govt. or govt. aided institute. Majority of student joins self financed private un aided institute. Therefore share in engineering education of private self financed institutes is @ 90%. It was essential that such self financed private un aided institutes must grow and contribute for the development of nation and also maintain the quality standards in spite of different challenges that they face in beginning.

In last 5-6 years, situation of self financed institutes has become alarming in respect of admission of student to their institute. Existence of large vacancy (less admission) has drastically affected financial stability of management there by development/question of existence of institute. And in particular for those institutes which are newly established and located in rural places.

The rational of this research study is based on thought that, in what way newly established engineering institutes located in rural places (irrespective of geographical location) will have to maintain academic standards, implement effective teaching learning process to have 100% admissions in their institute is a concern.

This research will focus on components of teaching learning viz. faculty and their performance, student’s performance, a mechanism to monitor these aspects on timely basis and relation between performance of teacher and students.
1.14 Basis for Research Work

The motivation for the research work is future scope of the research “Investigation on Improving Quality of Technical Education in a Self Financed Institution … A Management Perspective” by Prof (Dr) Hemant Abhyankar. In this it was investigated that, while seeking admission to engineering college, a student has to choose an institute for giving his preferences. What are the parameters that influence student/parents to take admission in a particular institute? It was proved that, if adequate information is available, students prioritize the following parameters while choosing an Institute. As per the outcome of survey done, following are the ranked parameters.

Table 1.9 Preference by students while selecting institute

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Choice of Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Placement (Job)</td>
<td>89.58</td>
</tr>
<tr>
<td>Qualified faculty</td>
<td>84.85</td>
</tr>
<tr>
<td>University Results</td>
<td>73.32</td>
</tr>
<tr>
<td>Spacious library</td>
<td>67.85</td>
</tr>
<tr>
<td>Posh Building</td>
<td>55.77</td>
</tr>
<tr>
<td>Attendance Compulsion</td>
<td>44.69</td>
</tr>
<tr>
<td>Sports facility</td>
<td>43.84</td>
</tr>
<tr>
<td>Mess facility</td>
<td>40.07</td>
</tr>
<tr>
<td>Comfortable Hostel facility</td>
<td>38.27</td>
</tr>
<tr>
<td>Closer to Big City</td>
<td>33.06</td>
</tr>
</tbody>
</table>

In the perception of faculty, following parameters were given to define good / quality institute with priority.

Table 1.10 Preference by faculty while deciding good institute

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Choice of Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified Faculty</td>
<td>53.78</td>
</tr>
<tr>
<td>Curriculum</td>
<td>43.16</td>
</tr>
<tr>
<td>Classroom Teaching</td>
<td>37.74</td>
</tr>
<tr>
<td>Academic Ambiance</td>
<td>34.42</td>
</tr>
<tr>
<td>Library Facility</td>
<td>34.34</td>
</tr>
<tr>
<td>Cont. Assessment</td>
<td>30.17</td>
</tr>
<tr>
<td>Leadership</td>
<td>28.8</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>25.6</td>
</tr>
</tbody>
</table>

From Table 1.9 and 1.10, it is very much clear that, the top parameters which will lead to make the institute, a good quality institute are campus placements, teaching
learning process which includes qualified faculty, classroom teaching, and University results. Student prefers such good quality institute for taking admission to complete their engineering education.

It may be noted that, the researcher has been associated with the research work since beginning and present thesis is an out-come of scope of further research from previous PhD research.

1.15 Motivation:

The cost of establishing any technical institution is high, that to when it is in city due to unaffordable land cost, construction cost and other resources. Therefore, trend is to establish engineering institutes at rural places in Maharashtra, but on other hand in last 5-6 years, it is a fact that these institutes are suffering vacancy problem (less admissions) at the time of admissions.

The research work tends to identify how the vacancy will be drastically reduced (increase in admissions) based on the identified parameters of good institute that are campus placement and teaching learning process which plays important role for getting good university result. Thus the objective of research is to improve teaching learning process which will affect on admissions positively and lead towards survival of rural institutes. The proposed mechanism will help the management of such institutes as guidelines.

1.16 Need and Significance of Study

Job offers through campus placement is always a key factor while selecting the institute for engineering education by parents as well as aspirng students. The same factor is affecting a large number of newly started private unaided self financed institutes. At present the scenario is, most of the seats are remaining vacant in such institutes. This factor directly affects financial management of newly stared institutes. The management is keen to ensure 100% admissions in their institute. To attract the students to the fullest capacity of the intake, teaching learning process carried out in such institutes must be effective. And to make it more effective, the institutes are always in need of good and qualified faculties.

Since the key performance indicators which will measure academic performance of teacher and student, are not available for newly established unaided self financed institutes, the objective of this research is to identify such indicator(s). Another objective of study is to provide the guidelines for achieving better results for such
identified indicator(s) which will help the management of such institutions to overcome the above mentioned challenges.

1.17 Summary
Understanding the importance of technical education in the development of nation, India vision 2020, Information regarding status of engineering education in India in pre & post independence era as well as its growth after 1983, Status of Ph.D and Research in Engineering and Technology, comparison of technical education in India with developed country was collected. It was essential to know, structure of education in India, and role of AICTE, DTE.
Researcher has studied profile of Maharashtra state with respect to GER, growth of engineering education in Maharashtra, Perspective Plan vision 2020 of Government of Maharashtra, number of Engineering Institutes located in Urban and Rural Area of Maharashtra. It has been observed that majority of engineering Institute are Private Self Financed Institutes.
If engineering education has to grow to match vision2020 of India and of Maharashtra with quality, the researcher has identified, what are the challenges faced by Management of Private Self Financed Engineering Institutes? This leads to rational behind study & Motivation. The information collected above narrates Need and Significance of Study.

1.18 Scope of the study
The scope of the study is to understand presently available monitoring mechanism to assure quality standards for well established institutes and identify Key Performance Indicators (KPI) for newly established engineering institutes. Use of these KPI to ensure quality teaching learning process through monitoring mechanisms which will result for improving admission status by reducing vacancy at the time of admissions especially in rural area. Ultimately such processes can be made useful to newly established engineering institutes.

1.19 Organization of the thesis
This thesis is structured into eight chapters.
Chapter 1:
Chapter 1 consists of understanding present status and need of engineering education in India followed by Maharashtra. Challenges faced by Private Self Financed Engineering Institutes and their visionary private charitable trusts that are willing to
impart technical education and would like to contribute to the national development.
It includes rational behind study, basis for Research Work, Motivation, Need and
Significance of Study, along with fact finding and relevant information.

Chapter 2:
Chapter 2 consists of review of literature. The work carried out by the researcher is
mentioned in this section to understand the present scenario of the research
undertaken. A study of literature is carried out to understand the perspective of
monitoring mechanisms viz NBA, NAAC for quality of education, teaching learning
process, availability/shortage of teachers, qualities of good teacher, students feedback
system, performance measurement of teacher and students, employability and TQM, ISO techniques.

Chapter 3:
Chapter 3 consists of framing statement of the research problem, objective of research
work, various definitions and framing of hypotheses with its justification.

Chapter 4:
Chapter 4 consists of the research methodology implemented to carry out the research
work.

Chapter 5:
Chapter 5 consists of analysis of collected data, and its interpretation.

Chapter 6:
Chapter 6 consists of observations and findings of the research work.

Chapter 7:
Chapter 7 consists of testing of hypotheses.

Chapter 8:
Chapter 8 consists of conclusions to this research work. The benefits of proposed
model are also mentioned in this chapter. This chapter gives overview of complete
research work and also proposes scope for future work.

Publications:
This section consists of the research papers published by the researcher based on the
research carried out. The research papers are published in International Conference
and National Conference as the first author and co author as well.

References:
This section consists of all the references referred by the researcher to study the present facts and scenario regarding quality in education, teaching learning process, and measurement of performance of a teacher and student in India.

Annexure:
This section consists of
Annexure 1: Students academic record – A Sample
Annexure 2: Hypothesis testing snapshots of SPSS
Annexure 3: Publications by researcher on the basis of the research topic
Annexure 4: District wise vacancy position in UG Engineering - 2012-13