

Institutional Transformation in Action of a Private Engineering College in Western Maharashtra – A Case Study

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Abstract - Ever increasing industry expectations from engineering graduates, growth in technology, changing academic roles and emerging and new career options make transformation, an imperative for technical education. Understanding the intricacies of technology transformation is critical to staying relevant in the technical education environment. Established in the year 1983, Kasegaon Education Society's Rajarambapu Institute of Technology (RIT) functioned as an affiliated college to Shivaji University till it became autonomous in 2011-12. The institute from the beginning wanted to carve a niche for itself as an institute imparting quality technical education to realize its vision, "Transformation of young minds in to competent engineers to face global challenges". RIT embraced a three pronged approach to sensitize the entire system and bring about a visible and sustainable change. RIT as a prerequisite to initiate the major changes in teaching-learning process implemented outcome based education (OBE), with a firm belief in the mantra. "We are teaching, are they learning?" This paper discusses the process of transformation, approach strategic initiatives adopted, key action areas and the outcomes of the process of transformation. The outcomes are visible in terms of increase in merit of students at entry level, better employability skills, increase research output, rewards and recognitions to the institute and faculty. This is just a beginning and RIT is looking forward to transform in to a nationally recognized and globally visible technological institute to attract the best talent both faculty and students for education and research.

Key Words: Institutional transformation, Outcome based education, Student centric education, best practices, teaching learning process, graduate attributes.

1. Introduction

Engineering education is among the key enablers of growth for transforming India's economy. The quality of teaching and research will play a critical role in the emergence of India as a global knowledge leader. The past two decades have seen many folds increase in the number of institutions imparting engineering education at both undergraduate and postgraduate level. Several recent surveys have reported the problem of un-employability and underemployment of engineering graduates.

The vision of the technical education must be to develop logical thinking, intellectual analysis and research pertaining to industrial development. Students must be job-providers relatively than job-seekers. Technical Education in India is at the doorstep and could do with major reforms as for building a trustworthy and reliable professional workforce which has to put together the country for the wellbeing of future generations.

Some of the major challenges faced in the field of technical education include, implementation of a science based modernizing engineering environment in the institutions. This includes creating technology savvy campuses, using Information Communication Technology (ICT) to augment teaching effectiveness. Developing a research centric culture at all level of education is another major issue. Another major concern faced in the technical education sector is developing faculty competence for enhanced

teaching and creative research. The institutions which offer technical education must be capable of offering the right mix of knowledge, skills and attitudes to deal with the presently rigid core specialties and also increase autonomy (Beanland and Hadgraft, 2013; Bake and Wiseman, 2008).

There is an established need to transform the engineering education and so also the educational institutions. This paper aims to present a case study of transformation of an engineering college in terms of strategic initiatives, process approach and outcomes of the process of transformation.

2. Educational Transformation

Employer expectations, growth in technology, changing academic roles public accountability, changing demographics, preference for engineering as career option make change as an imperative for technical education (Kezar and Eckel, 2002). No more than ever, understanding the intricacies of technology transformation is critical to staying relevant in the technical education environment. The technology landscape has changed dramatically over the last 15-20 years and also the expectations of learner. The successful adoption of these technologies and their underlying infrastructure can be a daunting and complex effort encompassing a comprehensive evaluation of strategies, human resource, processes and technologies (Prasanna and Chaudhary, 2013) India being an agrarian country, around 70 % of the nation's population is in the rural areas. Most of these areas are deprived from the advanced facilities available in the urban settings. This results in the lower rate of reach of students in to the technical education. This divide of rural and urban must be eliminated by facilitation. The education system must give serious attention to the language and communication skills along with various cultural and practice in these areas through molding methods.

2.1. Need to transform engineering education

Engineering education in India is undergoing a major change though the transformation is slow. The

need for the engineering education transformation is listed below;

- Decline in interest in engineering as a career path among young people in several major industrial countries.
- The fact that entry level engineers lack necessary skills.
- The business environment has changed but engineering education did not keep pace.
- Increasingly, engineers face challenges that involve large scale, complex systems.
- Engineers requiring strong interaction with non-engineer experts and the public.
- Current curricula rarely address such challenges and focused more on preparation in mathematics and physics and on engineering sciences.
- Making engineering education cross-disciplinary is though difficult, but a worthy challenge

2.2. Desired Skills of Engineering Graduates

Desired attributes of engineering graduates are changing and National Board of Accreditation published the graduate attributes for both undergraduate and postgraduate programs. Apart from domain knowledge the engineering graduates are expected to demonstrate special attributes to succeed in careers. Some of the important attributes include:

- Able to communicate effectively to technical and non-technical audiences.
- Able to self educate
- 'Process' large volumes of information – sift through and generate knowledge
- Understand that education of engineers continues for a lifetime
- Able to work in heterogeneous teams (including virtual teams) and to converse with professionals in Law and Business
- Willing to take risks, experiment, and be innovative.

Ethics and proper principles like self-discipline, dedication, temperament and truthfulness are as important as intellectual vividness.

3. The Transition to A Learner-Centered Paradigm of Education

Indian students used to be 'passive players' on a predefined education pathway. They had little choice in what they learnt and little say in how they learnt it. The curriculum was predesigned and worse still, outdated and seldom relevant, and the dominant mode of instruction was information-loaded, one-way lectures from the teacher to the student. If one were to describe the transformation in higher education pedagogy from then to now, dramatic would be an understatement. In today's classrooms, the student is an active participant in the education process and the role of a professor is that of a facilitator as opposed to an instructor. The instruction is designed to engage students in learning experiences that not only enable them to learn content but also to develop greater passion for learning – enabling them to 'learn to learn' and to be lifelong learners (Thompson, 2010).

In the learner-centered paradigm of education, students are encouraged to take greater responsibility for their learning outcomes. The professor ceases to be the fount of knowledge filling the empty receptacles of students' minds; instead, students actively participate in the discovery of knowledge. They are encouraged to be reflexive and thoughtful learners, learning from themselves, their peers and their immediate environment just as much as they would from their professors. Accordingly, the teaching-learning methodology involves less lecturing and rote note-taking and more hands-on activities to allow for experiential and interactive learning (Catalano and Karen and Catalano, 1999).

Over the years, such emphasis on learning has impacted students and learning outcomes in ways that have far-reaching impact for Indian economy and society. Firstly, by stoking students' innate curiosity and encouraging them to learn in self-directed ways, it has enabled Indian graduates to be independent, critical thinkers. As a result, it has greatly enhanced the country's innovation

capability and entrepreneurial ambition, positioning it amongst the most attractive R&D hubs for dozens of multinationals. Secondly, the learner-centered paradigm has helped India's thriving human resource base to keep pace with the changing needs of their work environments. Over the years, with evolution of the 'knowledge economy', learning and work have become inseparable, making constant on-the-job learning and up-gradation indispensable. Trained to be active and adaptive lifelong learners, the Indian workforce is known to be dynamic and agile even in the face of 'disruptive' progress.

Lastly, but importantly, the learner-centered approach has helped correct for the problem of equity in Indian higher education. As India's enrolment numbers grow, and access to higher education expands, the learner-oriented method has helped sensitize educators to difference in learning styles and student expectations that result from diversity in student backgrounds. By placing the student at the centre of the learning process, the approach on the one hand has enabled institutions to devise new and innovative ways to reach diverse learners, and on the other, helped students discover and exercise their distinctive learning styles to chart an educational pathway that is personally meaningful and relevant (Earnest and Young, 2008).

4. Institute Profile

Established in the year 1983, Kasegaon Education Society's Rajarambapu Institute of Technology (RIT) functioned as an affiliated college of Shivaji University with its responsibility limited to only curriculum implementation and delivery, the curriculum being designed and assessment of students by the university. The institute from the beginning wanted to be differentiated from many such institutes and create a niche for itself as an institute imparting quality technical education to realize its vision, "Transformation of young minds in to competent engineers to face global challenges". The institute which made its humble beginning in 1983 by offering two undergraduate

programs has grown by leaps and bounds within a span of three decades. Currently the institute offers 7 undergraduate programs, 10 postgraduate programmes in engineering and three departments recognized for Ph. D research Centre and also a post graduate programme in management leading to MBA with strength of around 3000 students. Though situated in rural part of western Maharashtra, RIT has established its brand image as provider of quality technical education with all its eligible programmes accredited and reaccredited by National Board of Accreditation (NBA), New Delhi. The institute with its capability to provide right ambience for teaching-learning and research is selected under ambitious, project of TEQIP Phase II, a World Bank project for improving the post graduate education and research. RIT with its strong commitment to transform the teaching-learning process along with excellent infrastructure and laboratory facilities and competent faculty is proactive in transforming the educational process to meet the changing expectations of its stake holders and works with a brand promise of "Career Assured". RIT practices the institutional core values and encourages students adopt to make them responsible citizens with civic sense. RIT has embraced the process of transformation as a strategy to stand out from the crowd and position itself as an institute with national and global recognition.

5. Transformation Approach

Transformation at RIT is achieved by realigning the way the management and faculty think and how the organization is structured and how technology is used. RIT adopted a systematic process approach for transformation which is represented in the diagram shown in fig (1).

Institutions in order to survive and grow, transform the entire institutional processes to produce graduates with requisite skills, knowledge and competency to meet ever rising expectations of employers globally.

This demands a change the way the institute should function i.e. the design and delivery of

curriculum, assessment of students, environment and technology support for learning, collaboration with external agencies, meeting global and national standards of education, state of the art laboratories, and competent faculty and attracting the students of high merit and providing multiple learning opportunities for students. This establishes the major agenda for change at RIT. The strategic plan of RIT depicts the future state map of RIT and clearly states what the institute wants to achieve on all the institutional.

performance criteria and clearly state the objectives

e.g. The future state of RIT is to attain the status of technological university national presence and global picture in mind. This statement shows what changes the institution has to bring in the entire system i.e. teaching-learning, research, and institutional management practices, infrastructure etc.

The clear understanding of what needs to be

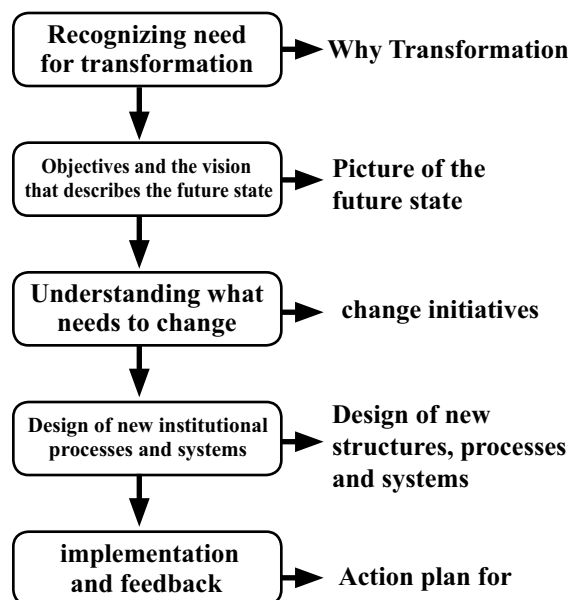


Fig. (1) Process View of Transformation at RIT

changed is a pre requisite to make change happen. In order to bring the change in action, a new system, policy guidelines and support systems are to be redesigned and implemented to make change irreversible and this brings in the associated benefits accompanying the implementation of change. To successfully bring about the change to reap the full benefits, RIT is sensitive to the changes that are happening in education around the world and adapting to the change that works well for the institution in long run. Change for the sake of change does not have any meaning.

6. Transformation Model

RIT embraced a three pronged approach to sensitize the entire institutional systems and bring about a visible and sustainable transformation represented in fig (2).

This approach is characterized by a collective wisdom of the board of Governors with varied competency in diversified fields like education, industry and research and social service. With a vast experience at their back, BOG members will be able to cast the future of the institute under the changing techno-economic scenario at the global level and and suggest a clear transformation approach and strategy to keep pace with new trends in technical education particular to India in general and RIT in particular. Most of the transformation initiatives are the result of this top down approach guided by the strategic plan of the institute based on one page strategic plan of Verne Harnish.

Bottom up Approach

RIT has all the respect and appreciation for the novel ideas, drives and initiatives originating from the competent faculty and also the students. Faculty drive the change initiatives and accountable for the implementation of transformation initiative. Thus, faculty expertise in successful implementation of change initiative plays an important role in shaping the future of both the institute and students.

RIT has developed a network with reputed national and international agencies which are

professional bodies, benchmarked institutes of higher learning, which promote excellence in education and research. Professional bodies like Indo-US collaboration for Engineering Education, (IUCEE), CITARA, IIT Mumbai, chapters of professional societies, collaborations and MOU's with Institutions and Industries have helped the institute to pave a way for excellence in what it is doing.

The NBA Accreditation committee's suggestions, distinguished national and international academicians and industry person's interactions helped the institute to benchmark the institutional practices with best in class globally.

6.1. RIT Transformation Model Initiatives

The transformation approach adopted by RIT prompted the institute to take up the strategic initiatives to achieve the level of expected outcomes and sustain the initiatives. The transformation model initiatives are represented in the fig (3).

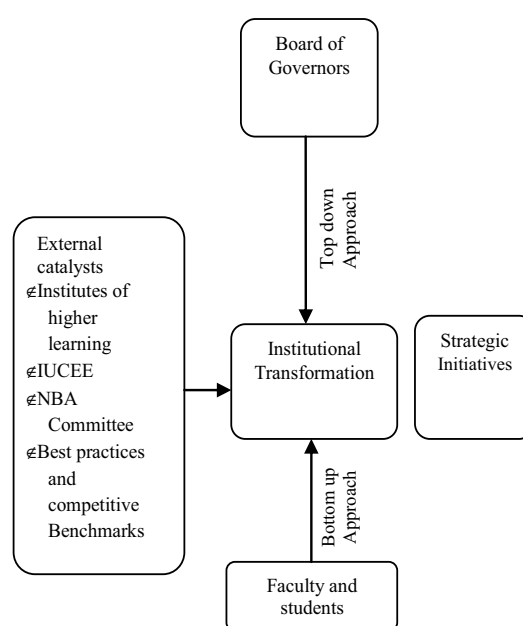


Figure 2. RIT Transformation Model

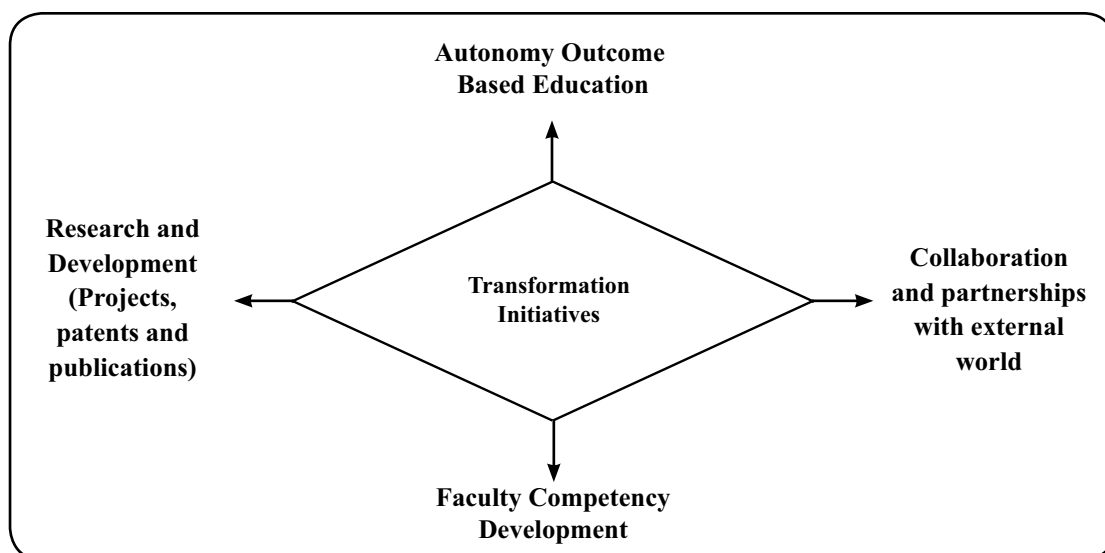


Fig (3) Transformation Model Strategic Initiatives

A. Academic Autonomy and OBE

RIT is accorded the academic autonomy from University Grants Commission (UGC) and Shivaji University, Kolhapur and implemented autonomy to B.Tech programs progressively and M.Tech programs from the academic year 2011–12. RIT embraced the outcome based education (OBE) which helps to design and deliver the curriculum, and assess the student's outcomes to make sure that they learn what they require to be learnt. (Learning Outcomes). RIT autonomy focuses on active learning and learning by doing (experiential learning) as against rote learning.

Some of the new initiatives in teaching-learning process include;

- Outcome based design and delivery.
- Use of active learning class room strategies.
- Focus on mini projects, course projects to give hands on experience of real world
- Innovative assignments to promote inquiry based learning.
- Industry visits and internships for students and faculty.
- Extensive use of ICT to enhance better learning.

- Assessment tools to measure the attainment of learning. Promoting self learning.

In addition to regular class room teaching and laboratory work, students are given opportunities to learn from multiple sources like IUCEE Webinars and mini courses ,QEEE online lecture series from IIT Chennai, NPTEL Video lectures to give the exposure to the best professors in the domain area, interaction with industries through plant visits, industrial internships, project assignments, lectures from industry experts helps the students to understand and bridge the gap between what they learn and what is being practiced.

B. Faculty Competency Development

RIT strongly believes that faculty and staff of the institute play a pivotal role in the institutional development and considers them as critical assets. In order to develop the academic and research competency and administrative skills, the institute provides opportunities for development.

Various facilities extended to faculty for development include:

- Opportunities for improvement of qualifications

by sponsorship to Doctoral research programmes in reputed institutes like IIT's and NIT's under QIP scheme of Government of India and other part time and full time schemes.

- Sponsoring faculty to international conferences outside India to present research papers.
- Promoting scholarship by extending opportunities to participate in national and international seminars, conferences and workshops and training programs.
- Organizing inhouse training programs with experts from outside, workshops and seminars on current trends, emerging and new technologies.
- Providing opportunity to participate in management capacity development programs.
- Industry internship for faculty.
- Support for publication of books and monographs.
- Programs on Educational technologies and outcome Based Education to bring awareness.

RIT over the years is successful in developing its own model of faculty development with a philosophy "catch them young and prepare them in due course of time to take up leadership positions."

C. Research and Development

Though RIT in the initial years focused on undergraduate programs, slowly the balanced approach of balancing both teaching and research was adopted. Research has taken a Philip with increase in number of postgraduate and PhD programs and implementation of TEQIP II project whose objective is promotion of PG education and research.

In order to develop research culture among faculty and students many initiatives are undertaken which have started yielding good results. Some of the initiatives are:

- Seed funding to faculty research projects to initiate research projects.
- Workshops and expert lectures to orient faculty to research and train them to prepare winning proposals for funding agencies.
- Developing advanced computing and laboratory facilities for research.

- Facilitation for filing patents and incubation of ideas.
- Promoting technology development and transfer to local needy community to enhance the quality of life of people.

In the last three years RIT is making a head way in promoting research among faculty and research and planning to establish the incubation Centre to promote the entrepreneurship.

D. Partnerships and Collaborations

In order to create a culture of continuous improvement, RIT took proactive approach to collaborate and work in association with institutes of higher learning both in India and abroad, industries, professional bodies and associations and NGOs for mutual benefits. These informal interactions have resulted in strong networks resulting in MOU's to take up activities of mutual interest like research projects, community related projectes, consultancy and training assignments etc. RIT is closely working with some of the US universities for joint programs, student and faculty exchange programs.

E. Institutional Leadership

The success or failure of any institutional transformation effort depend largely on the commitment and visionary leadership of chairman and members of the board along with a team of faculty at leadership positions which make things happen. RIT's board with exceptional knowledge, skills experience and expertise will be able to navigate the institute through the process of transformation and motivate and mentor the institute to redesign the process and systems and adopt a structured approach for implementing the change. RIT reorganized itself in to an organization structure represented in the fig (4).

F. Best Practices

The structure facilitates the delegation and effective implementation of autonomy and empowers the leaders to bring about the change faster for the benefit of the students and institute.

Many of the improvement initiatives started by the institute have become best practices of the institute and they act as differentiators for creating

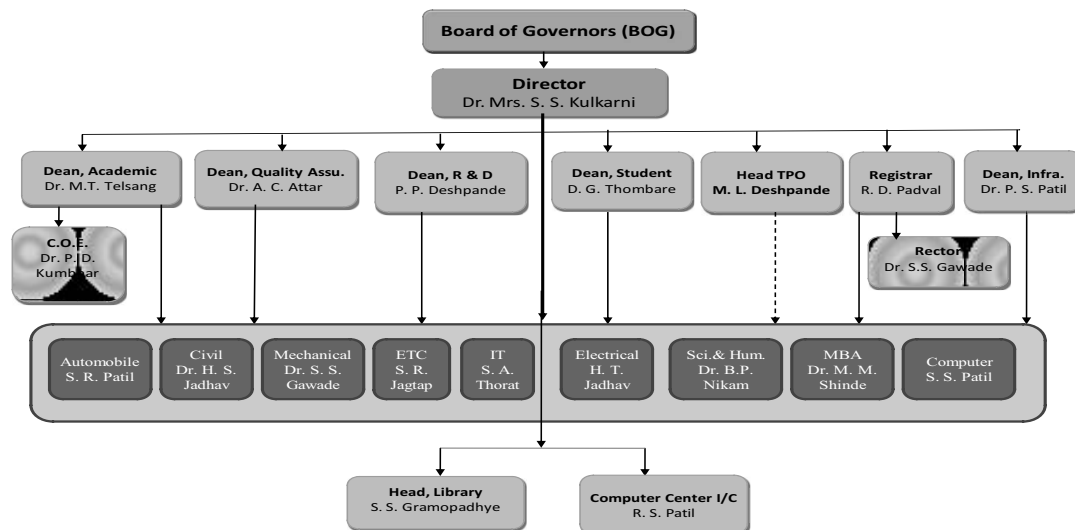


Fig.4 Organization Structure of Autonomous RIT

brand image. Quality Circles and Academic Audit are two such practices which have made a substantial impact on teaching learning process of RIT.

G. Academic Audit

The process of Academic Audit captures the classroom dynamics in an environment of ease and comfort. Class room dynamics here refers to delivery effectiveness, learning experience of students with different learning preferences and styles, factors that hinder the effectiveness of both teaching and learning. A detailed audit process is laid down including the guidelines to auditors and post audit counseling to faculty. The audit is designed to capture the five important dimensions of a teacher namely; subject knowledge, preparation and delivery, communication, class control and concern for students and opportunity to interact. The audit process is going to map the

Fig.4 Organization Structure of Autonomous RIT individual teacher and the course on a 10

point scale with appropriate weights for the five dimensions. Based on the scores the faculty competency improvement is planned and appropriate actions are initiated to train the faculty in the specified dimensions. The outcome of the audit is evident in terms of improved learning outcomes, enhancement of teaching deliveries and competency, collaborative learning, good academic environment. The Institute is practicing Academic Audit since 2009-10. Inspite of initial teething problems during implementation, the audit model is tending towards maturity with a substantial co-operation from both faculty and students. The improvement in teaching index of the institute since implementation is represented in Table (1). The outcome of the audit is evident in terms of improved learning outcomes, enhancement of teaching deliveries and competency, collaborative learning, good academic ambience.

H. Quality Circles

Quality circles are effectively practiced in

Table 1. Improvement in teaching index of the institute

Sr. No.	Teaching Dimensions	Weightage	Scores 2009-10	Scores 2013-14	Percentage Improvement
1	Subject Knowledge	3	1.80	2.34	30.0
2	Planning and Delivery	3	1.76	2.42	37.5
3	Class Management / Class Control	1	0.51	0.78	52.9
4	Communication and English	1.5	1.01	1.21	19.8
5	Accountability and concern	1.5	0.90	1.27	41.1
Overall scores		10	5.98	8.02	34.1
Note: (the figures indicate the average for the institute)					

RIT since last 20 years which serve the purpose of improving problem solving capability of faculty, problem diagnostics and analysis and creative approach towards generating alternative solutions. RIT is an institutional member of Quality Circle Forum of India (QCFI).

Quality circles of each department works with an annual theme and identifies the problem for suggesting and implementing a solution which promotes group problem solving and a sense of belonging among faculty.

Quality circles of RIT represented in regional and national and International level QC case study presentations and won many medals and awards.

7. Outcomes of Transformation Initiatives

RIT started the transformation process from the year 2009 and the changes that are introduced are yielding good results. The institutes visibility at the national level is on the rise and slowly the institute is moving in the direction to make its presence felt at international level through various collaborative activities and its association with Indo US collaboration for engineering education. Some of the notable recent achievements of the institute are:

- DQ- CMR Best Tech School Survey 2013-14, RIT Ranked 52nd as India's Top Engineering Colleges and RIT has bagged Sri VVR Seshadri Rao Gudlavelleru Engineering College National Award instituted by ISTE for The Best Private Engineering College 2013.

- All the undergraduate programs and eligible postgraduate programs are accredited and reaccredited by NBA New Delhi.

- RIT has 23 provisionally registered Patents and some are in the process of commercialization in last three years and Institute received the research funding to the tune of 1.5 crores in last 3 years from AICTE, DST and industries

- Continuous Increase in transition rate of students.

- RIT bagged Sustainable Institute Industry Partnership (SIIP) 2014 award for engineering college at IIT, Chennai RIT is among the First Ten Institutes in the survey of Industry linked Engineering Institutes conducted by AICTE and CII in 2012.

- Institute has succeeded in attracting the students of higher merit for both UG and PG programs and 25 students from South Sudan (Central Equatoria state) are admitted under PIO quota for the current academic year 2014-15.

- MOU with foreign universities, industries and Institutes of higher learning in India.

8. Conclusions

Engineering institutes in order to survive and grow in fierce competitive scenario and to position and create brand image should transform the institutional processes. Institutions should define their strategies and consequent future state of their systems and processes and develop transformational framework which can be used as an effective tool for defining the transformation roadmap for the

institution. Engineering institutions will continue to face major challenges from new competitors, changing expectations of employers, graduates and regulatory environment. The expectations of prospective learners are also changing along with their expectations for appropriate and effective learning services. The variable that can and should be managed is how quickly the institute can adapt to market needs. The case study discussed is an example of how an institution in rural settings can be able to make a national and international presence with clearly defined vision and goals of management with commitment to bring about a transformation to achieve and sustain the development and create a brand image.

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