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Role of Leadership with Equity, Integrity, Ethics, Humility, and Outstanding Culture in the Development of Engineering Institutions

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Abstract

Engineering institutes have to continuously develop effective and industry-specific curricula, outstanding faculty who can facilitate human capital, handle modern resources to meet the disruptions, and follow excellent culture to meet the growth of industrial practices. Many Institutional Development Models (IDM) assume that the leaders practice equity and ethics and create a conducive culture for all academic activities but many institutes fail to meet the challenges of fast-growing technologies. The problems are due to ignoring the underlying principles like equity, ethics, and integrity in many key areas of administration. Around 1000 engineering colleges have been closed in India in the last ten years and many traditional branches of engineering don't attract motivated students. Hence, this research has been undertaken to suggest the need to follow equity, ethics, and development culture in all institutional administrative activities. 25 underlying fundamental factors of development have been identified based on this research through the participation of 1152 engineering faculty members. An institutional development model has been created to incorporate these factors for the effective and rapid growth of the institutions and create needed human capital and knowledge capital. This institutional development model has been validated through a polytechnic college and found to be highly effective and efficient in transforming the institution and the faculty members to reach excellence. Further research studies at a larger scale are suggested for refining this model.

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1. Introduction

Most of the Governments which are members of the World Trade Organization (WTO) take quick steps to enable the rapid development of engineering colleges, state technical universities, and deemed universities. They implement capacity development, quality improvement, and efficiency improvement through soft loans from many International Development Agencies (IDA) like the World Bank, Asian Development Bank, etc. They also provide grants-in-aid for the globalization of engineering education and global networking. Further, they provide academic, administrative, and financial autonomy to these institutions and constitute a Board of Governors to supervise, guide, and monitor the growth of the institutions. However, not all institutions grow as planned. Most of the institutes have around 50% vacant posts even though the country has a large number of qualified, trained, and competent faculty members. Most of the models on institutional development assume that the institutions have excellent educational culture, and they practice equity, ethics, integrity, and humility. Many institutions suffer from the absence of growth-oriented leadership who don't focus on equity, integrity, ethics, humility, and outstanding culture to facilitate the faster development of the faculty members. In many institutions, unfortunately, corruption has been institutionalized and the qualified and high-performing faculty members continuously suffer. Many institutions couldn't attract the best-accomplished faculty members and students. For ten years around 1000 engineering colleges have been closed in India. Many administrators have unethically ruled the colleges. In these institutions, no academic audit on the performance of various departments and centers has been conducted. Many faculty members filed court cases when they are discriminated and they won the cases. This brings down the reputation of the institutions. Informal organizations have also grown in many institutions, and they create counter-production to human capital and knowledge capital development. Unless these problems are solved, the return on investments (ROI) will be meager. Many outstanding institutions have solved these problems amicably and developed an ecosystem for fast academic growth. They introduced environmental crime control (Glen Kitteringha, and Lawrence (2020). Philip (2013) created foundations of security and loss prevention. Brunt and Jodi (2014) have studied the methods of preventing victimization. Brunt (2013) suggested law enforcement culture. It is recommended that the administrators and the leaders have to focus on institutional development which comprises contributions to knowledge capital and human capital. Without creating an academic ecosystem, it will be impossible to achieve the strategic vision and mission of the institutes. The National Education Policy 2020 suggests that by 2030, all colleges will develop into degree-awarding institutions and the affiliation system will be stopped. This demands total development of all colleges in all aspects and become standalone institutions. This research work focuses on these problems and tries to solve them so that the growth of engineering education will be facilitated and the attributes of the graduates will be improved.

2. Literature Survey

Current literature on Internal Factors Affecting the Balanced Growth of the Institutions has been collected and presented in this part. It is found that the following factors affect the sustainability and balanced growth of the institutions: inequity, corruption, zero integrity, absence of humility, undesirable culture, improper planning and mismanagement in sharing the resources, absence of openness, growth of informal organization, victimization of a section of the faculty, racial

discrimination, elevation of coteries, etc. It is essential to identify the causes of the growth of undesirable factors and explore the process of eradicating them. Such measures will help the institute to retain the high-performing faculty teams who are intrinsically motivated.

2.1. Equity

Equity is fairness and impartiality based on the even-handed treatment of the members of an organization/ or institution. Current engineering educational problems in many developing and developed countries are difficulties in the proper selection of qualified, competent, and achievement-oriented faculty members, outstanding educational leaders, and dedicated administrators. Equity approaches will alone sustain the fast growth of desired attributes of engineering graduates and render effective service to society through creating human and knowledge capital. Many fast-developing countries focus on the vibrant development of engineering, management, applied sciences, and technology education by incorporating equity. In the absence of equity, the outstanding faculty will suffer and struggle to perform. It is always better to implement in all faculty development processes so that the best faculty team can be continuously motivated, assisted, and scaffolded to perform. Dara, et al. (2019) have suggested the need for equity in facilitating doctoral students.

2.1.1. Implementing Equity Principle in Higher Education

All institutes require high-performing and well-accomplished faculty teams for contributing their high-order cognitive services in analyses of the needs of users, designing the needed products, developing products, testing, and improving. The faculty team has to utilize their higher-order cognitive skills in designing appropriate manufacturing methods and maintenance of the products. Further, they have to display the needed attitudes for the growth of technology, students, and institution. The faculty members need equity for their uninterrupted growth. Hence, assess the equity challenges like race, religion, gender, state/province, economic status, country of origin, etc. Establish oversight of external entities such as faculty grievance and redressal mechanisms, human rights protection unit, and legal aids, create accountability mechanisms and accelerate the needed assistance to the faculty members through mentors. Establish performance monitoring mechanisms and eliminate the hostile climate in educational institutes. Eliminate corrupt practices in administration. Create needed resources and funds for development activities. Encourage bidding for consultancy projects and programs. Improve the effective recruitment process of the faculty members based on their qualities, accomplishments, and readiness to achieve excellence. Eliminate coercive methods and improve the in-house conflict resolution methods.

Establish innovative programs in consultation with the stakeholders with multiple entry and exit channels. Promote comparative global study and upgrade the programs and instructional design and delivery process. Focus on higher-order cognitive abilities, critical analysis, and problem-solving abilities, and encourage to undertake industry-sponsored research projects. Solve equity-based problems through a systematic review. Focus on educational challenges due to disruptive digital technologies. Eliminate barriers to equity and develop an ecosystem on recognition of high values in the transformation of graduates to meet the ever-growing industrial needs. Develop equity and excellence in education. Encourage racial and gender equity. Develop a vision of educational equity which raises profound ethical concerns.

Develop ways to reduce the persistent educational inequities that harm low-income groups and the students' poor social status. Safeguard educational institutions from unethical political interferences and update teacher equity methods through systematic development plans.

2.1.2. Factors to be Eliminated in Inequity

Don't elevate the nonperformers due to social or political pressures. Don't purposely elevate poor-performing faculty members who never significantly accomplished in academic performances, publication of outstanding research papers, publishing innovative textbooks, or establishing industry-specific graduate, or postgraduate programs. Don't underrate the highly accomplished and achievement-oriented faculty team members. Provide needed assistance to them so that their dedication will get more reputation. Kate (2021) suggested equity-centered engineering education. Nirma university implemented value added course on improving safety, ethics, and professional practice. Reena (2016) suggested including ethics in Indian engineering education. Rockwell (2020) stated that Chinese education has grown due to ethical education. Shirley (2004) recommended embedding ethics in the engineering curriculum. Susmita (2016) prepared a MOOC on ethics for the engineering faculty members. Tom Ricci (2012) suggested choosing an appropriate approach to teaching engineering ethics. The University of Patras implemented teaching ethics in engineering programs. Yinghui et al. (2015) have implemented a course in professionalism and ethics in engineering courses in China. Most of the fast-developing universities have implemented ethics in their programs.

2.2. Corruption-Free Institution

Throughout the world corruption virus has spread and it has entered higher education. Corruption is due to the lack of academic integrity and other ethical principles (Elena Denisova- Schmidt, 2018). The following corrupt activities are to be eliminated in higher education:

No.	Corrupt Activity	Action to be Implemented
1	Bribery: The offering, promising, giving, accepting, or soliciting of an advantage as an inducement for action that is illegal, unethical, or a breach of trust.	Select the faculty based on their qualification, accomplishment, character, motivation, and leadership.
2	Collusion/ Cartel: A secret agreement between the administrator, selection committee experts, unqualified faculty members, and their Godfathers to conspire to commit actions aimed to commit fraud with the objective of illicit financial gains.	Don't deviate from the recruitment rules, don't discard the high performance of the outstanding candidates, and follow the ethics in recruiting, fixing the pay scale, and offering advanced increments.
3	Conflict of Interest: A situation where an individual, or the entity for which this faculty works, whether a government, business, media outlet, or civil society organization, is confronted with choosing between the duties and demands of their position and their private interests.	Don't demand jobs for your kids from the companies which are receiving consultancy services from the institution. Don't offer free training to the faculty members from the institution which admitted your kids.
4	Favoritism/ Patronage: A form of favoritism in which a faculty member is selected, regardless of qualification or entitlement, for a job or organization benefit because of political affiliations or community links.	Don't select unqualified, less accomplished, and faculty members without higher cognitive abilities based on the forces from external organizations.
5	Fraud/Cheat: The act of intentionally deceiving the authorities to gain an unfair or illegal advantage.	Verify the degrees earned, letters of recommendation, publications, plagiarism, and stated accomplishment.
6	Lobbying: Activities carried out to influence an institution's policies and decisions in favor of a faculty member.	Don't eliminate the items stated in the recruitment rules, years of experience, publication, and consultancy works completed to favor an unqualified faculty member.
7	Revolving Doors: A faculty member who moves back and forth between institution and client organizations for the benefit of the clients he/she used to regulate.	Don't select faculty members who have a deep interest in the clients or have partnerships with the client organization.
8	Moonlighting: Faculty members undertaking consultancy works without the official approval or without taking leave.	Don't permit moonlighting.

2.3 Integrity

Integrity is a strict adherence to an established code, especially moral or professional values. Integrity implies the trustworthiness of administrators, leaders, and incorruptibility to a degree that one is incapable of being false to a trust, responsibility, or pledge. Probity implies tried and proven honesty or professional integrity. Honor suggests an active or anxious regard for professional standards of one's profession or administrative position. When integrity is not followed, the morale of the faculty members will collapse. Integrity is a personal and professional quality of fairness that faculty members all aspire to. Having integrity means reliably doing the right thing. It is a personality that faculty members, staff, and students admire, since, it means a faculty or leader or administrator has a moral campus that doesn't wave. It means having 'wholeness' of character. Integrity is very important for educational leaders, faculty members, and students. Integrity is an undivided or unbroken completeness or totality with nothing wanting. In every higher education institution, the educational leaders and administrators should display integrity in all actions in faculty/staff selection, promotion, planning development projects, and sharing project gains.

2.3.1. Factors to be Institutionalized in Integrity

Financial management, spending the grants-in-aid as per the project proposal, reimbursing the travel expenditure as per the rules, granting the contingencies as per the rules for research scholars, implementing the pay scales as per the sanction, deducting the income tax on the project gains distributed, etc. Always follow the General Financial Rules of the Government of India.

2.4. Humility

Describes charming, kind, soft-spoken, and approachable in a word, humble personality. They engage, empower, and inspire faculty members and students. They are humble and serve faculty members and students in an institution. They don't seek credit or administration of their work. They neither are weak nor passive. Their humility supports a boundless strength of character that creates the academic environment for so many faculty members to trust them, believe their views, and help them achieve their vision. Hubris is excessive pride or self-confidence and is the opposite of humility. Arrogance ultimately leads to the downfall of the institution. Humility balances out the extreme characteristics of hubris and lack of self-worth.

2.4.1. Factors to be Institutionalized in Humility

Sanctioning study leaves as per the norms and rules, providing travel grants for participation in national and international conferences, and reimbursing expenditure on development activities as per the approved annual development plans. Nominating the faculty teams who planned innovative products like Multi Media Learning Packages, Videos, publishing translated textbooks for other countries and sponsoring the well-accomplished faculty teams to assist in developing detailed project proposals under international development agencies (IDAs) like the World Bank (WB), Asian Development Bank (ADB), United Nations Educational and Scientific Council (UNESCO), United Nations Development Project (UNDP), United States Agency for International Development (USAID), etc.

2.5. Displaying Integrity in Action in Higher Education

Integrity has to be followed in all selection of the outstanding faculty members, promoting them based on their high standards of performance, their publications in international journals and conferences, consultancy projects that they completed, internal revenue generated by them, and the reputation that they brought. Integrity is also required in the purchases of equipment, maintenance, building construction, and disposal of unserviceable machines.

2.6. Ethics

Ethics in engineering practice is about the professional responsibilities of engineers who have been recognized as an important foundation in the practice of engineering throughout the world. Codes of ethics have been invoked as a basis for professional engineering licenses. Ethical decision-making is essential to professionalism in engineering and technology education. Further, ethics is a required topic in an accredited engineering and technology curriculum. Also, it is a concrete foundation that runs throughout the engineering and technology programs. The graduates have to carry the principles of ethics in their minds in all professional tasks. Ben Sawa and Sonia (2013) concluded that high-performing organizations benefitted due to recruiting, developing, and retaining excellent faculty members. Dianna et al. (2019) emphasized the multilevel of engineering ethics education. According to Haralampidest (2012), ethics and equity are needed to improve learning opportunities.

2.6.1 Ethics in Action in Higher Education Institutions

Ethics have to be displayed in all decision-making processes and implementation of the development of programs and services to society and industry. If the ethics are not followed, there will be more friction among the faculty members and students. Even many disputes will be filed in the courts and the judgments will erode the reputation of the institute and it will very difficult to regain the reputation even in the long run.

2.7. Desirable Educational Culture

Desirable Educational Culture refers to the ideas, customs, practices, and social behavior of many educational administrators, faculty members, technical support staff, office staff, researchers, and students in an educational institution. The meaning of culture is the customary ethnic groups, beliefs, social norms, and material traits of diverse faculty teams in an institution. Peterson and Spencer (1991) defined institutional culture as deeply embedded patterns of organized behavior and shared values, assumptions, beliefs, or ideologies that members have about their institution or its work. Institutional culture blends ideas of organizational culture and the disciplines of the institution. This includes the way things are done, what exists, and how things should be done. This also enables the kind of reflexivity necessary to clarify an institution's identity while highlighting its singular quantities (William Tierney and Michael Lanford, 2018). According to Swidler (1986), culture is the toolkit of habits, skills, and styles with which individuals construct, how they negotiate challenges, and how they would interact and behave. He also discusses beliefs about the institution, which would be about its nature and what it means to exist within it. Eckel and Harley (2008) observed that universities linked with private donors forged alliances with rich institutions, and created entrepreneurial partnerships with a variety of corporate entities to promote ties. Lanford and Tierney have stated that many well-performing universities have built branch campuses in foreign countries to nurture global networks and recruit students. Jongbloed et al. (2008) have stated that many national governments focused on improving the skillsets of workers to meet the challenges of a knowledge economy. They have encouraged tertiary institutions to plan new degree programs and expand access to students from previously underrepresented ethnic and socioeconomic backgrounds. The positive impact of culture on engineering institutes has been assessed by Adam and Dale (2018) Adrianna and Peter (2002), and Admin (2022). Their study reinforced the growth of engineering institutions. Cech (2014) focused on disengagement in engineering education, science, technologies, and human values. Chyung Seung Youn (2008) conducted a front-end-analysis and brought the factors that improve the performance of the workers in an organization. People need a good education, training, motivation, and goal. In the workplace, they need to have an ergonomically designed workplace, necessary operation manuals, job aids, a good environment, and interpersonal relations with coworkers. The organization should be led by appropriate leaders, they have to assess the performance and provide feedback, and they have to develop conducive culture. They have to focus on total development. Eckel and Mathew (2008) suggested developing an appropriate culture for developing strategic alliances. Gary et al. (2003) advised evolving needed execution culture in companies.

2.8. Corruption-Free Institution

Dishonest or illegal behavior is practiced mostly by powerful educational leaders/administrators. Corruption is dishonest behavior by those in positions of authority, such as vice-chancellors, directors, deans, and chairpersons. Corruption can entice a variety of actions, including giving or demanding or accepting bribes or inappropriate gifts or demanding bribes for faculty selection or swindling the externally funded project gains, or getting reimbursements for activities that are not related to the projects. Corruption is a form of dishonesty or criminal offense that is undertaken by an administrator of an educational institution who is entrusted in a respectable position of authority to acquire illicit benefits or abuse of authority for one's gain. Corruption may include bribery, influence peddling and other embezzlements. Transparency Organization defines corruption as the abuse of entrusted authority for private gain. Corruption erodes trust, weakens the academic ecosystem, hampers knowledge and human capital development, and further exacerbates inequality, loss of legitimate share of project gains, and social division of the high-performing faculty team members. Corruption also refers to misusing authority for family gains. The country needs corruption-free educational institutions. Only corruption-free institutions can alone grow faster than others.

2.9. Meeting the Challenges of Fast-Growing Disruptive Technologies

In this knowledge-based economy, all the leading engineering institutions are planning to improve their programs, faculty members, resources, and linkages with Multinational Companies (MNCs). The leaders have a greater role in shaping the culture, providing autonomy to the high-performing faculty members, modernizing the resources, and collaborating with the companies by undertaking consultancy projects in disruptive technology-based multidisciplinary areas. This gives rise to many start-ups. Engineering students are motivated to acquire needed attributes. The leaders have more role in shaping the institutional culture. Higher education leaders scaffold the faculty members in developing new approaches like online learning to ensure student learning in higher education (Katrina Meyer, 2010).

3. Objectives of Research

- Assess the adequacy of the high-performing culture of the institutions
- Identify the desired impact of equity, ethics, and integrity followed by growth-oriented administration to meet the challenges of disruptive technologies
- Suggest appropriate leadership for bringing rapid growth to engineering institutes.

3.1. Research Methodology

Discussions on culture, equity, ethics, and integrity have been held with 1152 faculty members of engineering colleges, both private and public, for three years. Most significant feedback has been recorded and analyzed. The majority of the faculty members stated that many institutions have not followed equity and ethics in recruiting faculty members. Many leaders have discarded integrity. A sizable number of court cases have been filed by the victimized faculty members and they won the cases. Due to this the reputation of the colleges has been affected in the long run. Further, institutional development has also lost speed. Many outstanding faculty members resigned and left the institution. Turnover is

maximum. Hence, in-depth research alone will provide needed guidelines for implementing equity, ethics, and integrity. Every institute has to create the best culture for the rapid growth of human capital and knowledge capital. All these steps will ensure rapid institutional development.

3.2. Institutional Development Initiatives

Most of the Institutions rapidly start developing based on the new opportunities due to the growth of the economy, globalization of the economy, a conducive environment, active linkages with the industries, efforts of the administration like strategic planning, recruitment of high-performing faculty members, their sustainable contribution to knowledge capital and human capital, increased grants-in-aid from the government, enrollment of highly motivated students, planning interdisciplinary curricula, developing high-quality learning packages, evaluating the contributions and sustaining the rapid development. To support this scenario, one has to develop a model which will assist the institutions and sustain the challenges of disruptive technologies.

The following 25 steps are identified to scaffold institutional development. These steps are briefly presented in the following section.

3.3. Leadership Development Center

Every institute has to establish a leadership development center that will conduct workshops, seminars, symposia, and conferences to develop needed leaders not only for management but also in every academic activity. Every faculty member has to be given the full opportunity to excel in his/her area of specialization. They have to be encouraged to develop monographs, textbooks, and research papers and plan for seminars, etc. They have to plan interdisciplinary postgraduate programs to develop human capital. The development of the institute largely depends on the strength of the leadership team in every academic activity.

3.4. Academic Council

An academic council in an institute will provide sufficient opportunity to plan an industry-specific curriculum, case studies, design projects, and industrial training. Many experts have to be invited to share the current advancements and near-future changes. All the faculty members have to be given opportunities to participate in the academic council deliberations so that they can own the decisions and plan to implement them.

3.5. Development of Interdisciplinary Engineering Departments

Efforts have to be made to establish interdisciplinary centers to offer appropriate courses to meet the needs of graduates. Wherever necessary, industry experts have to be invited to share their needs. They can evaluate the projects/dissertations completed by the students and give constructive guidance to meet the needs of the industry. The current National Education Policy 2020 also emphasizes interdisciplinary programs. Interconnections and

interdependence are required for the development of higher education (Jonghloed et al. 2008).

3.6. Development of Modern Laboratories and Workshops

The curriculum has to be periodically evaluated against the emerging needs of the industry. This demands up-to-date instruments, equipment, consumables, software, etc. Periodical modernization is essential not only to undertake research but also to offer testing services to the industry. Most of the research projects depend on well-calibrated instruments.

3.7. Faculty Development through various External Organizations like All India Council for Technical Education (AICTE), Academic Staff Colleges, Internship in Foreign Universities, and Massive Open Online Courses (MOOCs)

Faculty development will prevent teacher burnout. They have to be encouraged to plan long-term self-development by utilizing various opportunities. Whenever they are selected through bilateral training programs by foreign universities, they have to be facilitated to join. This will enable the department to become a center of excellence in the long term. Many human resource centers of the universities offer workshops for improving the skills of the faculty members and hence they have to be nominated. A few companies can be linked to offer needed exposure to the faculty. They can also undertake sponsored research projects. Self-directed learning can be encouraged.

3.8. Establishing In-House Faculty Development Centers

In-house faculty development centers can utilize the expertise of outstanding faculty members and plan workshops and seminars to develop newly recruited faculty members and managers of the companies. Alumni can be given opportunities to complete finishing programs. In-house faculty development centers gave many new opportunities to embark on innovative engineering programs and services to the industry.

3.9. Starting Industry-Specific Graduate Programs

The gap between the current graduate programs could be minimized by converting them into industry-specific programs with the active participation of local companies. New courses based on the current developments could be planned with active cooperation with the local companies. Video programs could be developed and utilized for executive training programs. Industry-specific programs closed the gap between the industry and engineering institutions. The graduates are job ready with the needed attributes.

3.10. Development of Instructional Packages (Print Materials, Models, Video Programs, and MMLPs)

Once the faculty completes one program, they have to edit and improve the course handouts. They can prepare self-instructional modules and supplement them with mass open online courses. Multimedia learning packages that combine advances in higher-order cognitive abilities, and problem-solving abilities are very much needed to enhance the attributes

of the graduates. Edited and updated course materials could be published to meet the needs of many universities and corporate training units.

3.11. Establishment of Interdisciplinary Postgraduate Programs

Interdisciplinary postgraduate programs are very much needed to develop analytical abilities, product development skills, and testing methods. Most companies are looking for appropriate postgraduate programs so that they can recruit them. Institutes can collaborate with the companies for planning new interdisciplinary postgraduate programs and industry experts can also offer courses and jointly guide dissertations. The graduates are wanted by transnational companies for analysis, design, prototype development, testing, and improvement of innovative products.

3.12. Establishment of Institutional Development Council (IDC)

Institutional development is an ongoing activity and hence a council is essential to assess the needs and plan new departments, and consultancy centers in the industrial hubs and corridors. Further, this council can plan new collaborations with various international universities and corporate universities. Outstanding product designers and manufacturing engineers could be invited to serve the council. The Development Council has brought many advancements to the institute. The graduates benefitted more through excellent jobs.

3.13. Establishing Interdisciplinary, Multidisciplinary Research, and Development Programs

The institute can plan many innovative research and development projects by getting funds/grants-in aids from various organizations like the Defence Research Development Organization (DRDO), Council of Scientific and Industrial Research (CSIR), Department of Science and Technology (DST), etc. The research associates can be facilitated to undertake a Ph.D. thesis through these programs. The outstanding faculty members have contributed immensely to the growth of the regional economy and a sizable return on investment. A culture of contributing to the growth of the economy has brought a reputation to the departments and the institute.

3.14. Establishment of Human Resources Development Centers/ Continuing Education Centers

Every Engineering University could establish a Center for Human Resource Development (HRD) for training the employees and executives of various companies. There are many development projects which are funded IDAs. They are looking for a well-established HRD center that can offer needed assistance in establishing company-specific training and development units. In addition, this center can prepare course materials for training the employees of various companies in the country.

3.15. Establishment of Consultancy Centers in the Industrial Hubs and Corridors

Now many industrial corridors are established in India. Mumbai- Bangalore- Chennai, Chennai-Vizag- Kolkata, Chennai-

Salem- Coimbatore- etc. Many industrial hubs need testing centers. In addition, they welcome a training center in each hub. Hence, engineering institutions can organize appropriate consultancy centers in the hubs and corridors.

3.16. Bidding for Development Projects under Various Ministries

Various Ministries of the Government of India publish the projects in leading newspapers and expect institutions, consultants, and professional associations bid for the project. Hence, engineering colleges can bid for these projects. The Institute can assist the project teams to plan for appropriate technical and financial proposals. The expertise of the project team and their previous successful projects completed will be highly rated. The project team has to prepare a viable costing proposal.

3.17. Bidding for Development Projects under various Transnational Companies

Many international companies publish the projects in leading newspapers. Hence, the faculty team can bid carefully and negotiate when short-listed. Since many international consultants will apply, the institute team has to focus on the terms and conditions prescribed. Sometimes they can undertake a part of the project as a subconsultant to an international professional organization that would have owned the project. Some of the IDAs who offload a part of the project are Danish International Development Agency (DANIDA), German International Development Agency (GIZ), Swedish International Development Agency (SIDA), United Nations Development Agency (UNDP), UNESCO, etc.

3.18. Bidding for Consultancy Projects Under International Development Agencies (IDAs)

Many IDAs expect a leading institution to take up projects which are to be implemented in other developing countries. Asian Development Bank, USAID, UNESCO, etc. look for reputed institutions to bid for development projects in Asian or African Countries. Hence, expert teams can bid for such projects based on their experiences.

3.19. Center for Diverse Global Faculty Development (CDGFD)

It is similar to other faculty development centers but the team should have enough international expertise in planning and bidding on such projects. Sometimes, private consultants may offload a part of a project to local institutions. The Ministry of External Affairs and the Ministry of Finance offer many diverse global faculty members development programs under bilateral agreements. Expert faculty members can bid on these projects.

3.20. Research and Publications

When many innovative programs are completed, it is better to publish the course materials through reputed publishers. Institutes own copyrights and can also sell video programs and MMLPs for the benefit of other organizations.

3.21. Performance Assessment, Counseling, Coaching, and Mentoring

Many newly recruited faculty members need continuous scaffolding for their intended growth. Initially, the head of the department can be a counselor. Other experienced senior faculty members can become coaches through faculty development programs and workshops. These newly recruited faculty members can choose mentors who can provide needed mentoring services. This will produce measurable improvements in skills and experiences.

3.22. Academic Audit, Assessment of Performance and identifying the Gaps, Planning Remedial Programs, and Focus on Continuous Growth

Academic audit of the projects completed will help to resolve many bottlenecks and obstructions in the future. Performance assessment will help the faculty members who are a novice. Further training can be arranged based on the identification of performance gaps. Remedial programs can be short-term courses, workshops, summer schools, industrial exposure or even nominating for MOOCs. These are recommended to improve the performance of the newly recruited faculty members.

3.23. Rewards for Accomplishments

Rewards are essential for reinforcing excellent accomplishments. Letters of appreciation, including the performance in the newsletters, displaying on the notice boards, or including in the Annual Reports will ensure their continued good performance. This will also motivate other faculty members to achieve in their areas of specialization or projects. Cash rewards can also be provided.

3.23.1. Impact of Negative Rewards

A few administrators don't circulate the letters of invitation received from the client organizations to their faculty members. Still more used to forwarding many letters of invitations to external organizations to get a lion's share of the gains. Administrators without any integrity took all the gains without sharing them with the faculty members who planned and completed the projects. All these actions discouraged the faculty members to plan and contribute to external organizations.

3.24. Faculty Handbook

Provide a copy of all rules and regulations about recruitment, probation completion, leaves, vacations, promotion, deputation, an extension of service, sharing the project gains, retirement benefits, policies on faculty development, reimbursement of travel expenditure for paper presentation, transfers, etc. Such initiatives will be of great use for the faculty members to plan various academic programs and projects.

3.25. Grievance Redressal Mechanism

In many projects, conflicts may arise due to a shortage of resources or multiple activities at the same time. Many

grievances may arise. It is always better to plan grievance redressal mechanisms so that no faculty develop mental agony. Project leaders have to take earlier steps to resolve the conflicts. Other service grievances are to be solved amicably so that the faculty member should not suffer from mental agony and upset. No faculty members should be penalized based on unethical practices like discrimination.

3.26. Professional Associations

There are many national professional associations in the country. The institute can permit the local chapter of the national association. The faculty can plan various activities in collaboration with the national association. Students can be encouraged to present papers. Whenever an international expert visits the city, he/she can be invited to present a paper at the local chapter of the association. It can also conduct a seminar/symposium or a workshop on a selected topic. These activities will enhance the professional achievement of the faculty members and the students.

3.27. Students' Academic Growth Facilitation Center

Ultimately the institute has been established to provide the best learning experiences to the students. Hence, all steps have to be followed to provide needed higher-order cognitive abilities, motor skills, and attitudes. The students should be guided to get the needed attributes, excellent character, finishing school performance-oriented courses, industrial training, and campus placement. They need proper counseling in choosing the courses, coaching for higher performance, and mentoring to continue to be professional.

4. Validation of the Model

This model has been validated in one of the polytechnic colleges and received excellent feedback. The faculty members have satisfaction, and professional growth, and offered the best services to the institute, students, and community. All the students have been well-placed in various companies. There was no strike by the students or faculty members. All the faculty members contributed to the total development of the institute. The institute's programs have also been accredited by the National Bureau of Accreditation (NBA).

4.1. Significant Outcomes of the Model

The best faculty teams have been retained. The students received better instruction and were provided with many industrial pieces of training in various companies in the nearby corridor, the institute offered testing facilities to various MSMEs in the industrial hubs, and a significant number of students were recruited by MSMEs. Newly recruited faculty members gained more expertise in curriculum planning, instructional design and delivery, and assisting the department in the testing of industrial materials. Their self-confidence increased. The reputation of the institute has also increased.

5. Conclusions

The leadership with equity, ethics, integrity, and a well-designed academic culture enabled the faster development of the institution. The institutional development model incorporated needed equity in recruitment, promotion, and training the faculty members. Integrity has to be followed by the management, faculty, and students. The academic ecosystem shall provide needed satisfaction to all stakeholders. The institute offers many employee development courses and assists faculty members to become leaders in cooperating with companies. The motivated students shall continue higher education. The return on investment yielded excellent intangible benefits also. The selected 25 factors can't be ignored for flawless institutional development with a well-designed academic ecosystem.

5.1. Limitations of the Model

The validation was done in only one institute. The cooperation of stakeholders has to be ensured for implementation. For modernizing the labs and workshops, a substantial amount of funds is required. It is difficult to get collaboration from the companies for closely working with the institute. All these are to be resolved for implementing the model. Further, there is a need for a government policy for close interaction with engineering institutes. Recruiting industry experts for short-term service is also a tough problem.

5.2. Suggested Follow-up Research

Further steps can be undertaken to include factors that are essential to overcome failures in engineering education and risk management.

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