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# Special Issue

on

# PROMOTING ENTREPRENEURSHIP AND STARTUPS IN HIGHER EDUCATION INSTITUTIONS

on the occasion of

## AIU SOUTH ZONE VICE CHANCELLORS' MEET—2025-26

hosted by

## M S RAMAIAH UNIVERSITY OF APPLIED SCIENCES
## BENGALURU

on

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**Association of Indian Universities**

**&**

**M S Ramaiah University of Applied Sciences**
**Bengaluru**

# Welcome

the delegates to the

**AIU South Zone Vice Chancellors' Meet—2025-26**
((January 20-21, 2026)

# From the President's Desk...

I am delighted to extend a warm welcome to all the esteemed Vice Chancellors and distinguished participants attending the **AIU South Zone Vice Chancellors Meet—2025-26** on the theme '**Promoting Entrepreneurship & Startups in Higher Education Institutions**' to be held at **M S Ramaiah University of Applied Sciences, Bengaluru, Karnataka,** during **January 20-21, 2026**.

This important gathering gives us a welcome opportunity to come together, share our experiences and reflect on the growing responsibility of higher education institutions in promoting entrepreneurship and startups in Higher Education Institutions (HEIs) is increasingly recognised as essential for preparing students to navigate complex economic and social realities. By integrating entrepreneurship education across disciplines, HEIs encourage students to think creatively, identify real-world problems and develop practical solutions. Experiential learning approaches such as project-based work, innovation challenges and startup internships help learners move beyond theoretical understanding and gain confidence in transforming ideas into action. In this way, HEIs become nurturing spaces where curiosity, initiative and resilience are cultivated alongside academic knowledge.

The theme of this AIU South Zone Vice Chancellors' Meet 2025-26, "Promoting Entrepreneurship & Startups in Higher Education Institutions' is especially relevant in today's rapidly changing world. In addition, HEIs play a crucial role in supporting aspiring entrepreneurs through institutional structures such as incubation centers, innovation labs, and mentorship networks. Access to guidance from faculty, industry experts, and alumni enables students and researchers to refine their ideas and understand market realities. Collaborative partnerships with industry and government further strengthen these efforts by providing resources, funding opportunities, and policy support. Through such a supportive ecosystem, HEIs not only empower individuals to pursue entrepreneurial pathways but also contribute meaningfully to innovation, employment generation, and broader societal development.

The AIU South Zone VC Meet 2025–26 brings together Vice Chancellors, educators and policymakers to reflect on the evolving landscape of higher education and to explore practical ways of strengthening our academic ecosystem. I am confident that the ideas and insights shared here will encourage thoughtful reforms and reinforce our collective commitment to building institutions that are socially responsive and environmentally conscious. By aligning academic excellence with sustainability goals, we can nurture graduates who are not only skilled professionals but also responsible citizens.

On behalf of the Association of Indian Universities, I extend my sincere thanks to M S Ramaiah University of Applied Sciences, Bengaluru, Karnataka for hosting this meaningful conference and to all the distinguished Vice Chancellors of the South Zone and delegates for their generous participation. Your presence and engagement add great value to this dialogue.

I look forward to the rich exchange of ideas and the spirit of collaboration that will unfold during this meet. Your reflections and shared experiences will play an important role in shaping a more sustainable, inclusive and forward-looking higher education system.

Vinay Kumar Pathak
President
Association of Indian Universities, New Delhi
E-mail: president@aiu.ac.in

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# Setting the Tone for AIU South Zone Vice Chancellors' Meet —2025-26 on *Promoting Entrepreneurship & Startups in Higher Education Institutions*

**Pankaj Mittal***

The Association of Indian Universities (AIU), one of the premier apex higher education institutions of the Country established in 1925, is a research-based policy advice institution to the Government of India in the field of Higher Education, Sports & Culture and internationalisation. Dr. Sarvepalli Radhakrishnan, Dr. Zakir Hussain and Dr. Syama Prasad Mukherjee are among some of the stalwarts who served AIU as its president. It currently has a membership of 1143 universities, including 20 international universities. Since its inception, it has been playing a vital role in shaping Indian higher education. Being an apex institution, it constitutes an integral part of decision-making and facilitates cooperation and coordination among Indian universities and liaise between the universities and the Government and also national and international bodies of higher education in other countries in matters of common interest. Also, AIU plays a dynamic role in shaping Indian higher education by being a research-based policy advice institution to the Government of India in the fields of Higher Education, Sports, and Youth Affairs & Culture. As a National Sports Promotion Organisation (NSPO) it promotes sports among Member-Universities.

One of the significant activities of the AIU is to convene the Vice Chancellors' Meets at the Zonal and National levels to discuss various issues related to higher education. India is a country with a large geographical area, for ease of reaching out, AIU has grouped the member HEIs into 5 zones i.e., North, South, East, West and Central. Thus, 5 Zonal Meets and one National Conference of Vice Chancellors are organised annually. These Meets are important platforms not only to discuss the significant issues of higher education but also to play a catalytic role in finding solutions for different problems of higher education through collective wisdom. Further, AIU carries forward the voice of the participating leaders of higher education to appropriate agencies and authorities for their dispensation. Every year in the National Conference of Vice Chancellors, a specific theme that is of topical significance for the higher education community is taken up for discussion. As a run-up, subthemes related to the main theme are discussed in the AIU Zonal Vice Chancellors' Meets.

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## Themes for The AIU Zonal Vice Chancellors Meet –2025-26

Based on current drifts and latent progresses, it is the right time to discuss about role of India in shaping the future of higher education. Therefore, for the year 2025-26, AIU has chosen the main theme '**Shaping Self-Reliant Bharat through Knowledge and Innovation'** for the AIU 100th National Conference of Vice Chancellors and all the five Zonal Vice Chancellors Meets for the year 2025-26. Under this overarching theme, the following themes are proposed for the AIU's Zonal Conferences:

| | |
|---|---|
| North Zone: | ***Integrating Traditional Wisdom in Curriculum and Research*** |
| East Zone: | ***Promoting Sustainability and Social Responsibility in HEIs*** |
| South Zone: | ***Promoting Entrepreneurship & Startups in Higher Education Institutions (HEIs)*** |
| Central Zone: | ***Creating AI & Quantum-Enabled HEIs*** |
| East Zone: | ***Self-reliant Bharat through Swadeshi, Economic Patriotism and Techno-nationalism*** |

Promoting entrepreneurship and startups in Higher Education Institutions (HEIs) is no longer an optional pursuit but a shared academic responsibility. In today's dynamic and uncertain world, our institutions must go beyond imparting degrees and actively inspire learners to think creatively, question existing models, and respond meaningfully to real societal needs. By integrating entrepreneurship

into teaching and learning across disciplines, and by encouraging hands-on experiences, innovation challenges and collaborative projects, HEIs can help students discover their potential as innovators and problem solvers. Such an environment nurtures confidence, adaptability, and a sense of purpose, enabling young minds to transform ideas into opportunities for themselves and for society.

Equally important is the role of HEIs in building a supportive and inclusive startup ecosystem. Through incubation centres, innovation labs, mentoring by faculty, alumni and industry experts, institutions can guide aspiring entrepreneurs through the uncertainties of early-stage ventures. Partnerships with industry, government, and funding agencies further strengthen these efforts by providing resources, exposure, and real-world relevance. When HEIs encourage entrepreneurship especially research-based startups and socially responsive innovations, they reaffirm their commitment to public good. In doing so, HEIs become not just centres of learning, but living ecosystems that empower individuals, generate employment, and contribute thoughtfully to sustainable national development.

## Format and Approach

The two-day event will include the Inaugural Session, Session on Interface with Officers from Apex Bodies i.e. UGC, AICTE, NAAC and ICAR, AIU Business Session, Valedictory Session and 3 Technical Sessions to discuss the concerned topics.

The three Technical Sessions will be held on the following subthemes:

**Technical Session 1**: Education for Increasing Entrepreneurship mindset in Students

**Technical Session 2**: Establishing Incubation and Innovation Centres to promote Techno-Nationalism

**Technical Session 3**: University–Industry Collaboration for Startup Development

Each Technical Session will be approximately 1 Hour and 30 minutes. In each Session, there will be 1 chairperson and 3 speakers, including experts from the Government and HEIs. Presentations will be followed by an interaction and Question and Answer session. Based on deliberations, a commitment statement will be framed for the universities to further the cause of Higher Education in India. In addition to academic deliberations, capacity development initiatives will be taken by forming a group of Vice Chancellors who will work on various dimensions of **Promoting Entrepreneurship & Startups in Higher Education Institutions (HEIs).**

## Technical Session Details

The following three sub-themes shall be deliberated upon during the Technical Session of the **AIU South Zone Vice Chancellors Meet 2025-26**:

### Technical Session 1: Education for Increasing Entrepreneurship Mindset in Students

Education for developing an entrepreneurial mindset in students is about much more than starting businesses it is about inspiring curiosity, creativity, and confidence. When learning environments encourage students to question, explore, and take initiative, they begin to see challenges as opportunities for innovation rather than obstacles. Through experiential learning, mentorship, and collaboration, students discover how their ideas can create real-world impact. This approach nurtures resilience and self-belief, helping learners embrace uncertainty with optimism and purpose. By making education more hands-on and reflective, institutions can empower young people to become independent thinkers and proactive problem-solvers who shape their own paths.

At a deeper level, fostering an entrepreneurial mindset humanises education by connecting learning with life. It teaches students that entrepreneurship is not only about economic success but also about creating value for society. When empathy, ethics, and sustainability are woven into entrepreneurial education, students learn to innovate with responsibility and compassion. They begin to understand that meaningful change starts with imagination and collaboration. Thus, education becomes a journey of self-discovery that cultivates confidence, creativity, and enable socially conscious individuals to become ready to contribute more in equitable and innovative manner.

### Technical Session 2: Establishing Incubation and Innovation Centres to promote Techno-Nationalism

Establishing incubation and innovation centres in HEIs offers a meaningful pathway to promote

Techno-Nationalism, the idea that technological progress should serve national growth and self-reliance. These centres provide young innovators, researchers, and entrepreneurs with the guidance, tools, and support needed to turn creative ideas into solutions that address local and national challenges. By encouraging the development of homegrown technologies, such initiatives nurture a sense of pride, purpose, and ownership among students. They learn that innovation is not just about invention, but about contributing to the nation's progress through self-sustaining, context-specific solutions that strengthen India's position in the global knowledge economy.

At a deeper level, innovation and incubation centres humanize the pursuit of technology by linking it with social and national responsibility. They create spaces where collaboration between academia, industry, and communities can flourish, ensuring that technological advancements are inclusive and ethically grounded. By supporting projects in areas such as clean energy, healthcare, and digital empowerment, these centres foster innovation that uplifts lives while advancing the nation's technological capabilities. Promoting Techno-Nationalism through innovation hubs transforms HEIs into engines of purposeful progress, where science, creativity, and patriotism come together to build a self-reliant and forward-looking nation.

### Technical Session 3: University–Industry Collaboration for Startup Development

University–industry collaboration plays a significant role in nurturing startup development by bringing together the creativity of academia and the practicality of the business world. When universities and industries work hand in hand, students and researchers gain real-world exposure, learning how to turn innovative ideas into meaningful products and services. Universities provide the space for experimentation, critical thinking, and research, while industries offer mentorship, resources, and an understanding of market needs. This partnership helps bridge the gap between knowledge and application, empowering young innovators to design solutions that not only succeed commercially but also address pressing social and technological challenges.

At a deeper level, such collaborations humanise innovation by connecting learning with purpose and impact. When students work alongside industry experts, they experience how ideas can evolve into enterprises that create jobs, improve lives, and strengthen communities. Incubation programs, joint projects, and internships give learners the confidence to take risks, learn from failures, and think creatively about the future. Through these partnerships, universities become more than centers of learning; they become engines of change that inspire students to innovate with empathy, responsibility, and vision, contributing to a culture of entrepreneurship that serves both people and the nation.

### Participation and Organization

Vice Chancellors/ Directors of Indian Universities/ Institutes, experts from the Government of India, senior officials of Apex Bodies of Higher Education and Academia will be Chairpersons and Speakers during the various session of the Meet. Experts from international organisations will also be invited to contribute during the discussion. All the deliberation will take place in English language. The sessions will be conducted in physical mode.

The AIU South Zone Vice Chancellors Meet 2025-26 will also be attended by more than 100 Vice Chancellors/ Directors of AIU member Universities/ Institutes of the South Zone covering the states of Tamil Nadu, Andhra Pradesh, Puducherry, Karnataka and Kerala.

### Conclusion

In conclusion, the AIU South Zone Vice Chancellors Meet 2025-26 being hosted at the esteemed M S Ramaiah University of Applied Sciences, Bangaluru, Karnataka from January 20th to 21st, 2026, promises to be a dynamic and insightful event, featuring significant gathering that will bring together the brightest minds and leaders from HEIs across the states *of* Tamil Nadu, Andhra Pradesh, Puducherry, Karnataka and Kerala to delve into the broad theme of 'Promoting Entrepreneurship & Startups in Higher Education Institutions (HEIs)'.

❑

# M S Ramaiah University of Applied Sciences, Bengaluru: A Profile

**M S Ramaiah University of Applied Sciences, Bengaluru, Karnataka is hosting the South Zone Vice Chancellors' Meet —2025-26 of the Association of Indian Universities on January 20th and 21st, 2026.**

Ramaiah University of Applied Sciences (RUAS) stands as a premier Private University in Bangalore, Karnataka, established in December 2013 under the Karnataka University Act No. 15 of 2013, registered as M S Ramaiah University of Applied Sciences. The establishment of RUAS unified various educational institutions from the esteemed Ramaiah Group, adapting them to embrace the present dynamics.

## Vision and Mission

**"***RUAS aspires to be the premier university of choice in Asia for student-centric professional education that lays emphasis on applied research while maintaining the highest academic and ethical standards.***"**

**"***Our purpose is the creation and dissemination of knowledge. We are committed to creativity, innovation, and excellence in our teaching and research. We inspire critical thinking, personal development and a passion for lifelong learning. We value integrity, quality, and teamwork in all our endeavors. and we serve the technical, scientific, and economic needs of our society. "*

The University is committed to addressing real-world challenges through multidisciplinary and societal relevance-oriented research, inclusive education, sustainable development initiatives, and service-learning, thereby contributing to social equity, public well-being, and national development. The University is dedicated to the creation, dissemination, and application of knowledge that addresses contemporary societal, scientific, and industrial challenges.

At RUAS, teaching and research are driven by creativity, innovation, and excellence, fostering critical thinking, personal development, and a lifelong passion for learning among students. The excellence fosters critical thinking, personal development, and a lifelong passion for learning among students. University upholds core values of *integrity, quality, collaboration, and social responsibility*, ensuring that all academic and administrative endeavors align with the highest standards of professionalism. Over the years, the University has emerged as a vibrant ecosystem connecting *academia, industry, and society***,** working tirelessly to nurture skilled professionals, researchers, and innovators.

Today, RUAS proudly offers **136 academic programmes, including Ph.D. programme across 13 Faculties/Schools/Constituent Colleges,** reinforcing its commitment to multidisciplinary education and applied research for societal impact while shaping the thinkers and leaders of tomorrow.

## Legacy and Leadership

Founded by the late Dr. M. S. Ramaiah, a visionary educationist who transformed millions of lives, a great philanthropist far ahead of his time. The Ramaiah Group began its journey with the establishment of the M. S. Ramaiah College of Engineering in 1962. What started as a single institution has today evolved into one of India's most respected educational and healthcare ecosystems.

Today, the Ramaiah Group comprises **21 institutions across healthcare and education,** catering to diverse sections of society. With a strong emphasis on inclusivity, accessibility, and social responsibility, the Group strives to contribute meaningfully to the nation-building exercise by advancing education, healthcare delivery, and community development—one initiative at a time.

## Governance at RUAS

The University is guided by the Board of Governors- Board of Management- Academic Council- Research and Innovation Council- Board of Studies- Department Academic Advisory Planning Committee (DAAPC), comprising eminent academicians, industry leaders, administrators, and professionals who provide oversight on policy, finance, strategic planning, and institutional development.

## Hierarchy of Academic Strategic Planning and Decision-Making at MSRUAS

Academic strategic planning and decision-making at RUAS follows a well-defined hierarchical structure to ensure effective governance, academic quality, and institutional accountability. At the apex is the Chancellor, who provides overall vision and strategic direction to the University. The Vice Chancellor leads academic, administrative, and research functions, translating institutional vision into actionable strategies. Provost, Health and Allied Sciences, and the Provost, General, Engineering and Allied Sciences oversee domain-specific academic planning, interdisciplinary integration, and implementation across their respective clusters. The Registrar supports governance through statutory compliance, policy implementation, and administrative coordination.

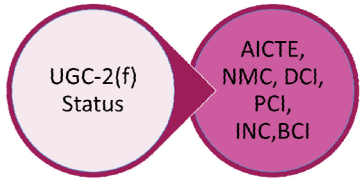
Academic oversight is further strengthened by the Dean (Academics), who ensures curriculum planning, academic regulations, and outcome-based education, and the Dean, Quality Assurance and Accreditation Cell, who leads quality enhancement initiatives and accreditation processes. The Controller of Examinations manages assessment, evaluation, and examination integrity. At the operational level, Faculty Deans guide Faculty-level academic planning, followed by Heads of Departments, who implement curricular and research strategies. Faculty members execute teaching, research, mentoring, and extension activities, forming the foundation of academic excellence.

The leadership team at RUAS works collaboratively to promote *Outcome-Based Education, Innovation and Research Excellence with Industry Engagement,* ensuring effective implementation of university goals. This robust governance framework enables RUAS to function as a future-ready University, responsive to the evolving needs of students, industry, and society.

## Recognition and Accreditations

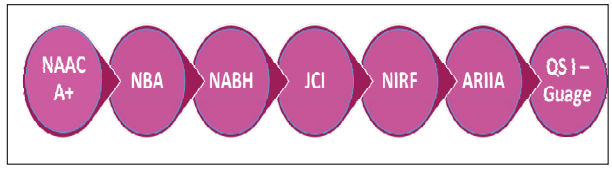
The University is recognised by the University Grants Commission (UGC) under Section 2(f) of the UGC Act, affirming its status as a statutory higher education institution in India (shown in Figure 1). RUAS holds mandatory approvals and disclosures from regulatory authorities, and other statutory bodies, ensuring compliance with national quality benchmarks in professional education.

**Figure 1: Recognition Status of Ramaiah University of Applied Sciences**




A cornerstone of the University's quality assurance framework is its accreditation by the reputed bodies validating their alignment with global educational standards.

**Figure 2: Accreditation/Ranking Bodies**

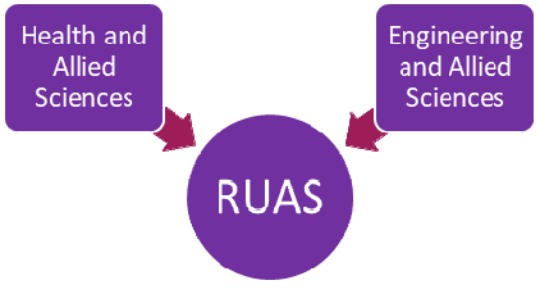



In addition to various accreditations, RUAS has been featured in the National Institutional Ranking Framework (NIRF), with placements in the 101–150 band in overall, Dental at 22, Pharmacy at 56 and Medical at 50 during the 2024–25 cycles. Collectively, these accreditations and recognitions highlight RUAS's robust quality assurance systems, commitment to continuous improvement, and adherence to best practices in higher education.

## Academic Structure

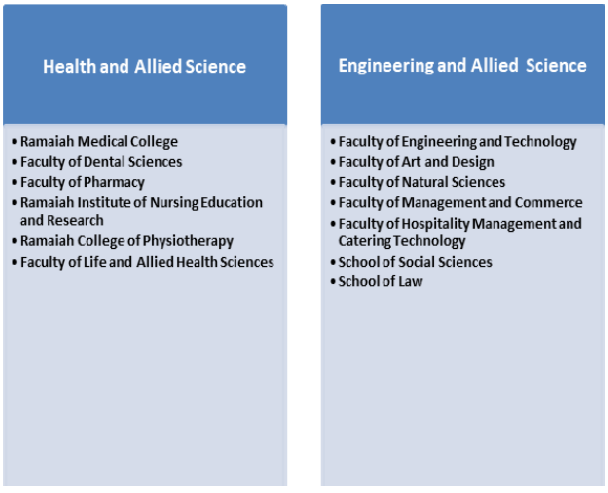
RUAS is constituted of a strong academic body comprising 13 Faculties, including Schools, and Constituent Colleges (shown in Figure 3), each housing discipline-specific departments that drive teaching, research, and innovation. These organisational units facilitate multidisciplinary and interdisciplinary collaboration, offering students exposure to contemporary fields and integrated problem-solving approaches.

**Figure 3 Faculty and Research Group at RUAS**



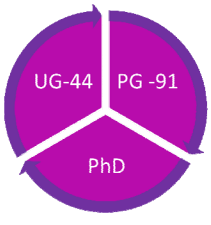
The University's integration of Health and Allied Sciences with Engineering and Allied Sciences reflects its strong multidisciplinary character. This ecosystem promotes holistic learning, collaborative research, innovation, and socially responsive solutions, enabling graduates to address complex real-world challenges with ethical, scientific, and managerial competence. Faculties/Schools/ Constituent Colleges included at RUAS are shown in Figure 4.

**Figure 4: Faculties/Schools and Constituent Colleges**




Each Faculty hosts departments that deliver discipline-specific undergraduate, postgraduate, and doctoral programmes**,** enabling students to pursue academic and research excellence. The programme distribution is shown in Figure 5.

**Figure 5 : Programme Distribution at RUAS**




RUAS offers a wide spectrum of programmes designed to meet evolving academic and industry needs. The University implements an Outcome-Based Education (OBE) framework, as shown in Figure 6, and the courses and teaching methods which facilitates OBE are shown in Figure 7.

The academic flexibility is provided to the majority of the programmes by adapting NEP- 2020 structure. The following provides academic flexibility for students to:

**Figure 6 : Programme Distribution at RUAS**

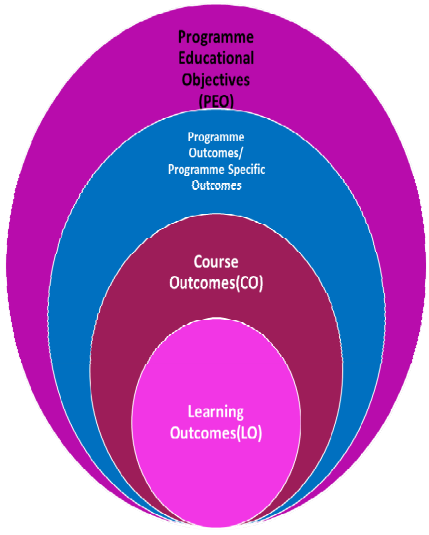
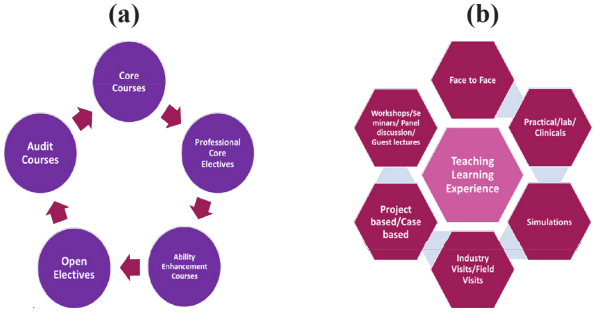



**Figure 7: Courses (a) and Teaching Learning Strategies (b) Practiced at RUAS**




- Select elective courses from a broad curriculum,
- Balance core, interdisciplinary, ability enhancement and skill-oriented components,
- Access MOOCs and NPTEL/SWAYAM courses for credits, and
- Customise learning pathways aligned with career goals.

This flexible structure promotes cross-disciplinary learning, personalisation, and academic mobility.

**Assessment:** Learning outcomes are mapped to assessment strategies, ensuring that graduate attributes such as analytical ability, professional competence, ethical reasoning, and lifelong learning are systematically attained. The University follows a transparent and robust evaluation system incorporating continuous assessments, term examinations, practical/project evaluations, and viva voce. These practices ensure fairness, reliability, and alignment with learning objectives.

**The key assessment features include:**

a) Weightage to assignments, quizzes, labs, and class participation.

b) End-semester examinations benchmarked to learning outcomes.

c) Use of rubrics for consistent and objective assessment includes:

- ***Knowledge-based Assessment Methods***: Term tests, Semester End Tests, Quizzes, Case-based MCQs, Problem Solving Exercises
- ***Skill-based Assessment***: Laboratory Performance, Clinical Performance, Demonstrations
- ***Higher Order Thinking Methods*:** Assignments, Projects, Industry-linked project statements, Research proposals, group projects, Dissertations and Thesis, Policy Analysis Assignments, Critical review of literature, Seminar presentations, Policy briefs, Technical reports, hackathons, case study presentations, Jury Type.
- ***Experiential and Field-based Assessment*:** Field work reports, community-based learning reports, logbooks, Industry Immersion feedback, outreach activity reports.
- ***Communication Skills*:** Seminar presentations, case presentations, Project presentations, oral examinations, debates, panel discussions, conference presentations.
- ***Professionalism and Affective Domain*:** Attendance and punctuality, Teamwork.
- Online exam management and result dissemination.

**Research, Innovation, and Consultancy**

RUAS demonstrates a strong and consistent research culture, reflected in its significant scholarly and innovation outputs. The University has filed 257 patents, of which 115 patents have been granted, underscoring the institution's emphasis on translational research and technology development. In parallel, the research community has produced an impressive 8,942 publications in reputed national and international journals, conferences, and indexed platforms.

These outcomes highlight the University's commitment to generating new knowledge, protecting intellectual property, and ensuring that research translates into societal and industrial impact. The steady growth in patents and publications reflects a vibrant ecosystem that nurtures innovation, interdisciplinary collaboration, and global visibility.

Doctoral research forms a strong pillar of the University's research ecosystem. Research **scholars are supported through RUAS institutional fellowships** such as Junior Research Fellows, Senior Research Fellows and Post-Doctoral Fellowships. **Scholars receive prestigious external scholarships** as **Junior Research Fellows (JRFs)** and **Senior Research Fellows (SRFs)** under the National funding agencies.

This structured financial support system enables meritorious researchers to pursue full-time doctoral studies, strengthens research continuity, and enhances the University's capacity to undertake high-impact, funded research across disciplines.

The citation performance of MSRUAS reflects the University's growing research impact across engineering, sciences, and health domains. Faculty from the Faculty of Natural Sciences (FNS), Faculty of Engineering & Technology (FET), Faculty of Pharmacy (FPH), and Faculty of Dental Sciences (FDS) feature prominently among the top-cited authors.

Research themes span advanced materials, nanotechnology, cancer therapeutics, artificial intelligence, IoT systems, and public health. Citation counts reaching up to 24 in a single year underline both relevance and quality**.** These outcomes signify RUAS's transition from output-driven research to influence-driven scholarship, strengthening its academic standing and international recognition.

Research promotion activities, including workshops on publication metrics, intellectual property awareness, industrial visits, and celebrations such as World Intellectual Property Day, highlight a culture that values innovation, creativity, and collaboration.

The institution demonstrates strong research performance with a total of 38,473 citations and an H-index of 68, reflecting significant scholarly impact. To promote early-stage research, 156 seed money grants have been awarded, amounting to ₹4.58 crore in internal funding support. During the period 2022–2025, the institution has undertaken 259 sponsored

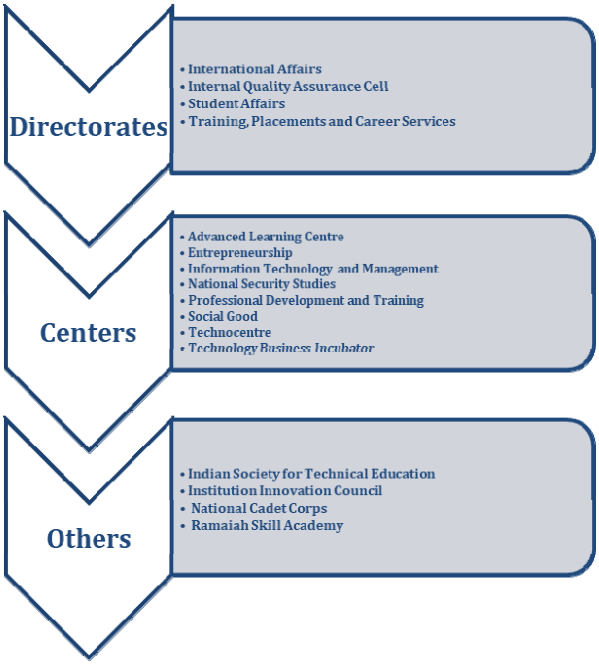
research projects, securing ₹23.15 crore in external research funding through 154 funding agencies, the predominant being the prestigious national funding agencies such as the ICMR, DBT, DHR, VGST, Atal FDP, KSCST, and KSTA, underscoring the institution's strong research ecosystem and national recognition.

These achievements reflect RUAS's institutional pride in building a sustainable, inclusive, and impact-driven research ecosystem aligned with national priorities and global academic standards.

### *Directorates/ Centers/Others*

The University is supported by dedicated centres and directorates that strengthen extracurricular and co-curricular activities, training and placements, student welfare, research, and innovation (Figure 8). These functional units provide structured guidance, skill development, and holistic support, ensuring comprehensive student development beyond the formal curriculum.

**Figure 8 : Constituents of Directorate, Centers and Others**




The Ramaiah Technology Business Incubator (RTBI) is now in Phase 2 with financial assistance of ₹5.21 Crores. The incubator currently nurtures 43 start-ups (including 13 added in Phase II) across domains like IoT, ESDM, Robotics, and Intelligent Systems, with patented technologies demonstrating its innovation culture. Moving forward, RTBI is broadening its scope to include emerging sectors such as Food Tech, Biotech, and Space Tech.

RUAS maintains a robust ICT infrastructure supporting teaching, learning, research, and governance. A high-speed campus network connects over 250 IP-enabled devices, supported by secure servers, comprehensive Wi-Fi, and enterprise-grade cybersecurity. University-wide ERP and LMS platforms streamline academic and administrative processes, enabling blended learning, digital assessments, and transparent governance. The CITM Centre enhances this ecosystem through nearly 180 smart classrooms, RFID-enabled library services, video-conferencing facilities, and high-performance computing.

Outreach initiatives promoting digital inclusion, along with comprehensive hostel, healthcare, sports, and recreational facilities, ensure a secure, future-ready, and student-centric campus. A centralised Tally server and enterprise-grade security architecture—supported by next-generation firewalls, intrusion detection, and malware protection—ensure data confidentiality, integrity, and availability across the institution. This ICT framework is integrated with a University-wide Enterprise Resource Planning (ERP) system that streamlines admissions, examinations, finance, purchasing, human resources, and academic administration.

A dedicated Learning Management System (LMS) enables blended learning through digital content delivery, assessments, feedback, and student engagement tools. Together, these platforms facilitate online academic delivery, digital assessments, real-time academic monitoring, and transparent administrative processes, reinforcing RUAS's commitment to efficient governance and digitally empowered education.

### *Ramaiah Advanced Learning Centre*

The RALC is recognised worldwide as today's reference training centre in minimally invasive surgery. The state-of-the-art learning facility has contributed to training 1000s of clinicians and future doctors, providing an immersive learning experience. Single station labs involving "one to one training" especially in Orthopaedic procedures (Arthroscopy, trauma, tendon repair, arthroplasty, PAF fixation, Spine instrumentation) are available for the clinicians.

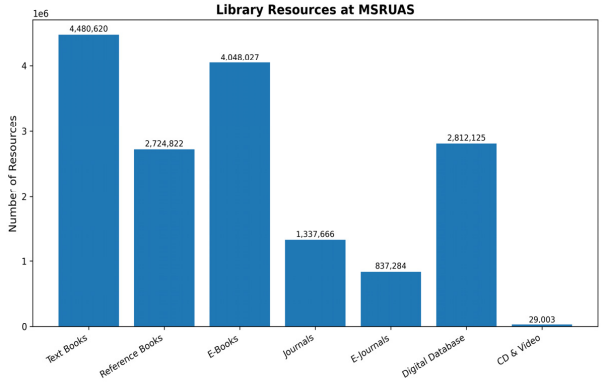
## Learning Resources

RUAS houses a well-established and learner-centric Central Library that serves as a vital academic resource supporting teaching, research, and extension activities across disciplines. The library's achievement highlights include:

- **Extensive print and digital collections** comprising textbooks, reference books, e-books, and scholarly journals that cater to the diverse learning and research needs of students and faculty.
- Access to high-value electronic databases, enabling seamless global research engagement through journals, conference proceedings, and e-resources.
- Automated library services powered by an Integrated Library Management System (ILMS), ensuring efficient and user-friendly operations including circulation, cataloguing, and resource discovery.
- Robust digital access through remote login and dedicated terminals, enabling research continuity beyond physical spaces.
- The library's training and orientation programmes have enhanced information literacy and research capabilities among users.
- Access to DELNET, NDL, NPTEL, and other e-resources further strengthens the academic and research ecosystem by supporting continuous learning beyond classroom hours.

These accomplishments underline the library's role as a dynamic knowledge hub, contributing significantly to academic excellence, research productivity, and lifelong learning at MSRUAS (shown in Figure 9).

**Figure 9: Library Resources through Integrated Library Management System (ILMS)**




## Student Profile, Support Systems, Training, Placement

The University has a strong national outreach with students from different states spread across academic disciplines. Gender inclusivity is evident across faculties, with women students constituting 33.52% of the total student enrolment. In alignment with its commitment to equity and inclusive education, RUAS extended academic and financial support to 1,356 economically disadvantaged students and 1,426 socially challenged students.

These students benefited from structured mentoring systems, counselling services, institutional and government scholarship schemes aimed at improving retention, academic performance, and overall student wellbeing.

## Training, Placement, and Career Support

The Directorate of Training and Placement at RUAS plays a crucial role in transforming academic excellence into strong career outcomes through sustained industry engagement, structured pre-placement training, internships, and continuous mentoring. Each year, over 300 companies, including 150+ multinational recruiters, participate in campus placements across engineering, management, sciences, healthcare, and design. RUAS has achieved notable milestones, with the highest domestic package of ₹52 LPA and international offers. A vast majority of our students from the health science group and the Management and Social Science group opt for higher studies.

## Student Affairs

The University's 13 student clubs, coordinated by the dedicated Directorate of Student Affairs, actively commemorate several International and National Days, including Independence Day, International Yoga Day, and World Photography Day, thereby fostering civic responsibility and cultural awareness among students. Major festivals are celebrated in both campuses very traditionally, and *Rajyotsava* celebrations—Kahale and *Dindima*—highlight Karnataka's rich cultural heritage through rangolis, traditional games, and cultural competitions.

*Akaira 2024*, the annual cultural fest of RUAS is a vibrant two-day celebration of student talent, creativity, and teamwork. The fest featured a wide range of on-stage and off-stage events, including quizzes, creative challenges, music, dance, fashion

shows, and theatre performances. In recognition of its excellence, Akaira was awarded the Best Cultural Fest (University) for the Academic Year 2023–24 by the Bangalore Cultural Fest Community, with the award presented on 27 July 2024 in Bengaluru. Cultural initiatives included the Festival of Russian Culture in South India and the nationwide youth pledge event "Yuva Shakti, Bharat Ki Shakti."

The University further promoted holistic development through diverse initiatives managed by the Directorate of Student Affairs, such as a Symposium of Meditation Leaders, an international farewell programme for German students under the BayIND German Immersion Programme 2025, and the SPHOORTHI Annual Athletic Meet 2024–25, which witnessed participation from over 700 students and 100 staff members. Collectively, these activities strengthened cultural engagement, international exposure, physical fitness, and community bonding across the University.

**Social Responsibility**

The service to society programme, since the early phase of the university, has been active in engaging a proportionate number of students in multidisciplinary teams is structured community outreach across seven locations, including government schools, old-age homes, orphanages, and care facilities for the underprivileged and differently abled. Each year, more than 1000 students have engaged in executing impactful projects such as mural painting in schools, companionship and donation drives, vocational training support, and career guidance programmes. The initiative provided students with first-hand exposure to societal challenges while reinforcing the University's commitment to social responsibility. RUAS also has adopted certain schools in rural areas and has demonstrated commitment through sponsoring infrastructure, computers and recruiting teachers for communication and computer skills.

The Ramaiah Skill Academy (RSA), strengthens industry–academia linkage through future-ready, skill-based programmes in Advanced VLSI Design, Embedded Systems, and Software Engineering, training over 250 aspirants with expert mentoring and modern infrastructure, leading to successful placements. Complementing this, the Centre for AI for Social Good promotes responsible and inclusive AI adoption through winter schools, industry-collaborative workshops, expert talks, and hackathon mentoring. During 2024–25, over 100 external learners were trained, RUAS teams ranked among the Top 30 nationally in Urban Vision Hackathon 2025, and pre-summit events for the India-AI Impact Summit 2026 enabled strategic dialogue on AI policy and human capital.

RUAS actively promotes conferences, workshops, Faculty Development Programmes (FDPs), and seminars to strengthen research culture and professional competence. The University has hosted and participated in major national initiatives such as Smart India Hackathon 2024, ANVESHAN (South Zone Student Research Convention), NISP adoption, YUKTI Innovation Challenge, and the AICTE Productisation Fellowship, fostering innovation, project-based learning, and entrepreneurship. Students are encouraged to pursue MOOCs through NPTEL and SWAYAM, complementing curricular learning with flexible, credit-aligned courses. A vibrant entrepreneurial ecosystem is evident through student-led initiatives like The Startup Society (TSS) and successful ventures such as HealAI (GVA Health), supported by Startup Addas, mentoring, and industry interactions. In 2024–25, the establishment of an NCC unit further strengthened leadership, discipline, and national service. Collectively, RUAS's co-curricular, outreach, skill development, AI initiatives, and extension activities ensure *holistic* student development, nurturing socially responsible, technically competent, and innovation-driven graduates who contribute meaningfully to society.

**Industry Interaction, Collaborations and Internationalisation**

RUAS actively fosters national and international collaborations to enhance research excellence, innovation, and industry–academia engagement. The University has established 161 active Memoranda of Understanding (MoUs), including 118 national and 43 international partnerships, demonstrating a strong and expanding global footprint. Engineering Sciences account for 47 MoUs focused on AI, data science, manufacturing, materials, design, and emerging technologies, enabling joint research, internships, and faculty development. Health Sciences contributes 40 MoUs with hospitals, diagnostic centres, rehabilitation institutes, and research organisations, supporting clinical training, patient-based research, and translational healthcare innovation. Management

disciplines hold 13 MoUs emphasising industry immersion, entrepreneurship, live projects, and executive education.

These collaborations facilitate student internships, industrial and clinical training, joint research, consultancy, faculty exchange, skill certification, innovation, startups, and technology transfer. Collectively, RUAS's MoU portfolio reflects its practice-oriented academic philosophy, ensuring continuous engagement with industry, healthcare systems, and global academic and research networks.

## Health Care Services

Ramaiah Memorial Hospital (RMH), established in 2004, is a 500-bed multi-super speciality quaternary care hospital accredited by JCI, NABH, and NABL. In June 2025, RMH received the JCI Gold Seal of Approval, reflecting excellence in clinical quality, patient safety, and outcomes.

The hospital is also certified by the American Heart Association as a Comprehensive Chest Pain Center and by the American Stroke Association as a Comprehensive Stroke Center. RMH is equipped with advanced infrastructure, including Cath labs, MRI and CT units, LINACs, PET scan, Da Vinci robotic surgery, modular OTs, advanced ICUs, transplant and BMT facilities, and a fully automated laboratory. The FACT accreditation of the Bone Marrow Transplant unit underscores adherence to rigorous international standards. Affiliated with Mount Sinai International, New York, since June 2024, RMH hosts Centers of Excellence in Cardiac, Oncology, Neuro, Nephro-Uro, and Gastro-Enteric Sciences, supported by global collaborations and community outreach initiatives.

### *Ramaiah Medical Teaching Hospital*

The Hospital has emerged as a premier healthcare institution providing quality tertiary care to patients in Karnataka and from across the country. The Hospital is empanelled with various health insurance, TPA's, corporate and government organisations, and schemes, making quality healthcare accessible to all sections of society at a subsidised cost. The hospital is also accredited with prestigious accreditations like NABH and NABL which demonstrate our commitment towards quality healthcare services.

### *Ramaiah Dental Hospital*

Ramaiah Dental Hospital, established in 1991, is a fully equipped tertiary care teaching hospital with state-of-the-art technology catering to patients from a wide geographic region. The hospital comprises nine speciality clinics and two speciality units (Esthetics and Implantology), supported by over 80 clinicians.

It is empanelled with KSRTC, BBMP, and CPRI, facilitating accessible dental care for diverse populations. In addition, the Kaiwara outreach centre and the Mobile Dental Clinic (Danta Suraksha) play a pivotal role in delivering comprehensive oral healthcare services to underserved and underprivileged communities.

**Figure 10: Chancellor, Dr. M. R. Jayaram, Honored with Prestigious Karnataka Rajyothsava Award, 2025**

A significant highlight of the year was the *Rajyotsava Award conferred on the Hon'ble Chancellor*, recognising distinguished contributions to education, research, and societal development (Figure 10). This honour underscores the University's commitment to excellence, ethical leadership, and best practices in higher education, fostering a culture of quality, accountability, and continuous advancement. ❑

# Scenario-based Learning: A Key to Entrepreneurship

**Ravindra Kharadkar***

Higher Education Institutions (HEIs) and Universities are undergoing a shift from traditional teaching methods to learner-centric approaches. ICT-enabled learning, flipped classrooms, peer teaching, and collaborative learning have become integral to modern pedagogy. However, despite these advancements, gaps remain in connecting theoretical knowledge with real-life applications.

The primary goal of any education system is not only to impart conceptual understanding but also to ensure that students apply classroom learning to solve societal and industrial problems. Scenario-based learning addresses this gap by providing learners with authentic contexts that stimulate innovation, research aptitude, and Intellectual Property (IP) creation.

## Scenario-based Learning and Its Relevance

Scenario-based learning allows students to explore realistic situations that require analysis, decision-making, and solution development. Unlike traditional laboratory experiments—which are often close-ended and designed merely to verify principles—scenario-based tasks motivate students to apply theoretical concepts to real-world problems.

Current project practices in HEIs often involve topics suggested by mentors or derived from existing research. Consequently, students rarely observe real-life needs while selecting project themes, limiting creativity and reducing the likelihood of converting academic work into impactful products or startups.Encouraging students to identify challenges and problems from their surroundings and propose solutions; fosters deeper engagement with technology and nurtures entrepreneurial mindsets.

## Encouraging Real-Life Problem Identification

To cultivate innovation, students must be guided to recognise real-world issues and think critically about potential solutions. Mentors play a crucial role by facilitating:

- Observation-based learning.
- Exposure to industries, public spaces, and social institutions.
- Brainstorming sessions on contemporary issues (e.g., AI risks, social media limitations, traffic-signal security, weather forecasting gaps).

Such activities enable students to derive meaningful problem statements. Solutions emerging from these discussions may lead to novel ideas, prototype development, patentable innovations, and entrepreneurial ventures.

## Multidisciplinary Learning and Skill Development

Scenario-based learning naturally promotes multidisciplinary collaboration. Real-world problems often require expertise from multiple domains such as computer engineering, electronics, mechanical systems, chemical engineering, and environmental science.In the process of developing solutions, students learn new skills, including:

- Coding and algorithm design.
- PCB development.
- IoT integration.
- CNC and manufacturing processes.
- Solar and renewable energy technologies.

This broad exposure enhances both technical competence and adaptability—key traits for entrepreneurial success.

## Developing an Ecosystem for Scenario-based Learning

### *Faculty Awareness and Training*

Effective implementation requires faculty who understand the philosophy and methods of scenario-based learning. Training programmes should include exposure to real-life scenarios and case studies.

*Example*

Traditional attendance methods—roll calls, attendance sheets, and biometric systems—have limitations like time consumption in the class

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and proxy attendance marking. The Faculty can motivate the students to identify these problems and encourage them to design improved methods, such as time-bound barcodes or OTP-based digital attendance systems. Such exercises model practical scenario-based learning.

***Idea Wall***

The Idea Walls can be set up at the Innovation Centre of the Institute. Students can post the real-life problem they identified and propose a conceptual solution for the same

An *Idea Wall* can serve as a platform where students display identified problems and proposed solutions. Expert panels can periodically review the ideas based on:

- Feasibility.
- Innovativeness.
- Utility.
- Non-obviousness.

The best Ideas can be rewarded.

This encourages open ideation and constructive feedback.

***Ideathons***

HEIs can organise ideathons to help students identify real-life challenges and conceptualise preliminary solutions. Ideathons need not finalise project topics, but should focus on enhancing students' observation, creativity, and analytical skills.

***Idea Lab and Innovation Centre***

Once the feasibility of an idea is validated, students can transform it into a prototype using the facilities provided by the *Idea Lab*. These may include:

- 3D printers.
- IoT development kits.
- Flexible manufacturing setups.
- PCB design and testing equipment.

The Innovation Centre can offer guidance on patent filing, copyright procedures, and incubation support.

**Conclusion**

Scenario-based learning significantly enriches the educational experience. Encouraging learners to frame problems from real-life scenarios it enhances critical thinking, conceptual clarity, and problem-solving capabilities. It also promotes multidisciplinary collaboration and technical skill development.

Prototypes and products emerging from scenario-based learning are aligned with actual user needs, making them more scalable and market-ready. This strengthens the innovation ecosystem within HEIs and supports the growth of start-ups and entrepreneurial activities.

❑

# Mathematics: The Engine of AI and Quantum Technology

**Rabinder Henry* and Rajan Welukar****

As Artificial Intelligence and Quantum Technology redefine global economic and technological structures, mathematics has emerged not merely as an academic discipline but as strategic capital. In service-led economies such as India, where decades of growth were driven by Information Technology (IT) services, IT Enabled Services (ITES) and process execution, a structural shift is underway. OECD economies are the primary sources of technology contracts that are rapidly transitioning towards automation-first, AI-native, and product-centric models. In this transition, tool-based learning without mathematical foundations risks creating a workforce optimized for obsolescence rather than innovation. This article argues that mathematics is the foundational language of AI and quantum systems, the differentiator between tool users and tool creators, and the decisive factor that will determine whether India remains a strategic technology partner or becomes a commoditized service provider. This paper critically examines the consequences of bypassing mathematics in education, the limitations of tool-centric skill development, and the urgent need to reposition mathematics at the core of future-ready education systems.

## A Silent Shift Beneath the Noise (Chaos)

Artificial Intelligence tools are becoming easier to use. Quantum technologies are becoming more visible. Coding platforms, low-code systems, and AI copilots are being democratized at unprecedented speed. At the surface, this appears to be an era of inclusion wherein anyone can build, analyse, design, and deploy. Beneath this surface, however, a silent stratification is occurring. The global technology ecosystem is dividing into two distinct classes:

1. Those who use tools (Users)
2. Those who create, control, and evolve tools (Creators)

This divide is not defined by access to software or platforms. It is defined by mathematical depth. For countries like India whose service economy has historically depended on scale, manpower, and execution efficiency this divide carries existential consequences.

## Mathematics a Subject or Cognitive Infrastructure

Mathematics is often misrepresented in education as a hurdle, a filtering mechanism and a prerequisite to be "gotten through" but in reality, mathematics is the cognitive infrastructure the internal operating system of scientific and technological reasoning. Here cognition defines the ability of artificial system to learn, think and take decisions. Mathematics trains the mind to abstract reality into models, reason under uncertainty, understand limits, constraints, and trade-offs, generalize solutions beyond specific cases and think in systems rather than instances

Every advanced technology including Artificial Intelligence (AI), quantum computing, robotics, cyber-physical systems, biotechnology entirely operates on these exact principles. When mathematics is avoided, removed or diluted, learners may still *operate* technology, but they lose the ability to understand, question, improve, or reinvent it.

## Mathematics as the Language of Artificial Intelligence

Artificial Intelligence is not built on intuition or pattern recognition alone. It is built on formal mathematical structures. At the core, AI relies on linear algebra (vectors, matrices, tensors), probability theory and statistics, optimization theory, information theory, graph theory and topology. Training a neural network is a mathematical optimization process. Evaluating model bias is a statistical exercise. Understanding overfitting, generalization, and robustness requires probability theory. When AI is taught purely through tools models become black boxes, failures become mysterious, ethics becomes superficial and safety becomes reactive. Mathematics turns AI from magic into mechanism from something that is used into something that is understood. The foundational role of mathematics for building cognitive technology including AI is listed in Table 1.

## Mathematics as the Only Language of Quantum Technology

Quantum technology represents an even

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**Table 1: Mathematics as Language of AI**

| |
|---|
| **Artificial Intelligence** (Learning, Reasoning, Decision, Autonomy) |
| **Algorithm & Optimization** (Machine Learning, Deep Learning, Search, Control) |
| **Statistics & Probability** (Uncertainty, Inference, Learning from Data) |
| **Mathematics-Foundation** (Logic, Calculus, Algebra, Geometry, Structure) |

stronger case. Unlike classical systems, quantum systems do not align with everyday intuition. Quantum states are vectors. Quantum gates are operators. Measurement outcomes are probabilistic amplitudes. There is no alternative descriptive language as shown in Table 2.

Without mathematics:

- Quantum education becomes memorization.
- Simulation replaces comprehension.
- Hardware development becomes trial-and-error.
- Nations remain consumers, not contributors.

Quantum advantage is not unlocked through tools but it is unlocked through mathematical control of physical phenomena.

**Table 2: Mathematics the only language of Quantum Technology**

| |
|---|
| **Quantum Applications** (Quantum Computing, Communication\|, Sensing, Cryptography) |
| **Quantum Algorithms & Protocols** (Shor, Grover, QAOA, Teleport.) |
| **Quantum Information Theory** (Entanglement, Entropy, Error Correction, Measurement) |
| **Quantum Physics** (Superposition, Interference, Wavefunctions, Operators) |
| **Mathematics-Foundation** (Linear Algebra, Complex Numbers, \|Probability, Group Theory) |

## The Illusion of Tool-Based Learning

Tool-based learning is attractive because it is fast, marketable, measurable and immediately employable. However, it suffers from a critical flaw: tools are designed to eliminate the need for the user. Every successful tool follows a predictable lifecycle that includes expert-only usage, simplified interfaces, automation of best practices and replacement of routine users. AutoML replaces junior data scientists, Copilots replace routine coding, and low-code or no-code platforms replace configuration roles. Tool users are not future-proofed but they are scheduled for replacement.

## Creators' vs Users: The Real Skill Divide

As AI tools become widely accessible and embedded across industries, mere tool literacy rapidly loses its value as a differentiator. When everyone is trained to use the same platforms, competitive advantage shifts upward in the value hierarchy. Routine tool users become easily replaceable, integrators retain relevance only temporarily, and demand increasingly concentrates around those who can extend, create, and architect systems. At the top of this hierarchy are system architects and tool creators, whose skills remain scarce and mission-critical. What fundamentally distinguishes creators from users is their ability to operate one abstraction layer deeper. Rather than focusing on execution, they understand why an algorithm works, the conditions under which it fails, the assumptions embedded within it, how it scales across contexts, and how it can be optimized or re-designed. This capability is not procedural or platform-dependent; it is rooted in mathematical reasoning and systems thinking, which enables enduring relevance even as tools, frameworks, and technologies evolve as listed in Table 3.

## India's IT Service Model: A Structural Inflection Point

India's IT services industry has reached a structural inflection point that cannot be addressed through incremental reskilling or marginal efficiency gains. The long-standing model that has been built on labour arbitrage, process execution, and large-scale human-driven delivery was optimized for a previous era of global IT demand dominated by cost reduction and outsourcing. That era is decisively ending. OECD economies, which constitute the primary source of India's IT revenues, are rapidly adopting automation-first strategies, AI-native systems, and outcome-based contracts that fundamentally reduce reliance on manpower-intensive services. As routine development, testing, and support functions are automated, the comparative advantage of scale is eroding. What is now demanded is deep technical ownership that includes algorithmic expertise,

**Table 3: Role, Functional and Market demand**

| Role Level | Primary Function | Market Demand Characteristic |
|---|---|---|
| Tool Users | Operate AI tools and platforms | Highly replaceable |
| Tool Integrators | Connect tools into workflows and systems | Temporary and transitional |
| Tool Extenders | Customize, fine-tune, and extend tool capabilities | Relatively stable |
| Tool Creators | Design core algorithms, models, and platforms | Scarce and high-value |
| System Architects | Design end-to-end intelligent systems and abstractions | Critical and strategically vital |

system architecture, product engineering, and continuous optimization of intelligent systems. This shift represents a permanent realignment rather than a temporary market correction, compelling India's IT ecosystem to transition from service execution to intellectual leadership or risk progressive marginalization in the global technology value chain.

## OECD Economies and the Automation Shift

OECD economies are undergoing a decisive transition toward automation-first and AI-native operating models that is reshaping global technology demand. Enterprises across manufacturing, finance, healthcare, logistics, and public services are systematically reducing dependence on manual and repetitive IT functions by embedding automation, machine learning, and autonomous decision systems directly into their core operations. As a result, the nature of external technology engagement is changing: contracts are increasingly outcome-based rather than effort-based, delivery teams are becoming smaller and more specialized, and value is being measured in terms of system performance, resilience, and continuous optimization rather than hours billed. What was once classified as "support" now involves mathematically intensive work such as model monitoring, drift detection, algorithmic optimization, safety validation, and real-time system orchestration. This shift fundamentally raises the skill threshold for participation in global technology supply chains and favours partners capable of deep algorithmic, mathematical, and system-level reasoning over those offering scale-driven service execution. Routine services are being automated internally and external vendors are expected to deliver intellectual value, not manpower.

## Why Mathematics Determines Value Capture

In a service-led economy, the central challenge is no longer employment generation alone but sustainable value capture within global technology markets. Roles that require limited mathematical depth tend to deliver low margins, face intense competition, and remain perpetually vulnerable to automation and cost pressures. In contrast, mathematically intensive roles including those involving algorithm design, optimization, system modelling, and performance engineering that enable ownership of intellectual property, outcome-based pricing, and long-term strategic relevance are the need of the hour. Mathematics allows organizations to move beyond billing for effort toward commanding value for insight, reliability, scalability, and innovation. It is this mathematical foundation that determines whether firms remain interchangeable service providers or evolve into indispensable technology partners. As automation accelerates and tools become commoditized, mathematics increasingly defines where economic power, negotiation leverage, and durable value ultimately reside. Mathematics is the difference between billing hours and owning platforms. Table 4 shows the core mathematical area and their importance in building AI.

Artificial Intelligence is not driven by tools alone, but by a layered mathematical foundation that governs learning, reasoning, and decision-making.

## Product and Platform Transition Requires Mathematics

The transition from service-based delivery to product and platform-led technology development is fundamentally constrained by mathematical capability. Unlike services, which can scale through process replication and manpower, products and platforms demand rigorous modelling of user behaviour, system performance, reliability, and long-term scalability. AI platforms, SaaS products, digital twins, and autonomous systems must operate under varying conditions, optimize continuously, and withstand

**Table 4 : Role of Mathematical Domains in Building AI**

| Mathematics Area | Core Concepts | Applications in AI |
|---|---|---|
| Linear Algebra | Vectors, matrices, eigenvalues, tensors | Neural networks, embeddings, transformers, image and speech processing |
| Probability Theory | Random variables, distributions, expectation | Uncertainty modelling, Bayesian inference, generative models |
| Statistics | Estimation, hypothesis testing, regression | Model evaluation, bias detection, performance validation |
| Calculus | Derivatives, gradients, partial derivatives | Training neural networks, backpropagation, optimization |
| Optimization Theory | Convex/non-convex optimization, constraints | Loss minimization, hyperparameter tuning, reinforcement learning |
| Information Theory | Entropy, mutual information, KL divergence | Feature selection, representation learning, compression |
| Graph Theory | Nodes, edges, connectivity, traversal | Knowledge graphs, recommendation systems, social network analysis |
| Discrete Mathematics | Logic, sets, combinatorics | Search algorithms, rule-based systems, symbolic AI |
| Stochastic Processes | Markov chains, random walks | Reinforcement learning, sequential decision-making |
| Geometry & Topology | Manifolds, distance metrics | Dimensionality reduction, clustering, representation learning |
| Numerical Methods | Approximation, iterative solvers | Large-scale model training, numerical stability |
| Game Theory | Nash equilibrium, payoff matrices | Multi-agent systems, strategic decision-making |
| Boolean Algebra | Logical operations | Decision trees, logic-based AI systems |

real-world uncertainties that are requirements that cannot be met through tools or frameworks alone. Mathematics underpins performance prediction, fault tolerance, optimization, and explainability, determining whether a product merely functions or sustains competitive advantage in global markets. Without a strong mathematical foundation, attempts to move up the value chain remain superficial, resulting in platforms that depend on imported intellectual depth rather than indigenous innovation. End of the day tools accelerate development but it is Mathematics which determines survival.

**National Risk of Bypassing Mathematics**

Systematically bypassing or diluting mathematics in education creates a long-term national vulnerability that cannot be corrected through short-term reskilling or tool adoption. An ecosystem deprived of mathematical depth produces shallow innovation pipelines, weak advanced research capacity, and limited ability to generate original intellectual property. Over time, this leads to dependence on imported technologies, reduced influence over global standards, and diminished strategic autonomy. While such systems may temporarily sustain employment through tool-based roles, they struggle to transition toward high-value product development, advanced AI, or quantum technologies. The cumulative effect is wage stagnation, declining global relevance, and an erosion of technological sovereignty, even in the presence of a large and active workforce. Such systems may produce employability, but not sovereignty.

## Mathematics and Creativity: A False Dichotomy

The notion that mathematics suppresses creativity is a persistent but fundamentally flawed assumption. In reality, mathematics enables structured imagination by providing a framework within which ideas can be explored, tested, and scaled. Generative AI relies on probabilistic models to produce novel outputs, parametric and computational design use mathematical relationships to explore vast creative spaces, and quantum algorithms exploit interference patterns to achieve outcomes that defy classical intuition. In advanced robotics, architecture, music, and visual design, mathematics transforms creativity from isolated inspiration into repeatable, evolvable innovation. Far from limiting creative expression, mathematical thinking expands it by allowing creativity to move beyond intuition and into systems that can adapt, optimize, and endure. Mathematics enables scalable creativity which means that ideas can be tested, refined, and deployed reliably. The human ability to understand the entire Universe and its components is only through mathematics.

## Education as a Strategic Design Choice

Education is not a neutral or purely academic endeavour; it is a strategic design choice that shapes a nation's economic trajectory, technological capability, and long-term sovereignty. Decisions about what is emphasized in curricula that foundational mathematics or transient tools, deep understanding or surface-level proficiency directly determine whether learners become system thinkers or platform-dependent operators. An education system optimized for immediate employability through tool-based training may deliver short-term outcomes, but it systematically erodes long-term adaptability and innovation capacity. In contrast, an education framework that prioritizes mathematical reasoning, abstraction, and systems thinking equips individuals to navigate technological shifts, create new platforms, and lead emerging domains. In the AI and automation era, educational design choices are inseparable from national competitiveness and strategic relevance.

## Mathematics as Strategic Capital

In the era of Artificial Intelligence, quantum technology, and automation-driven economies, mathematics functions not merely as an academic discipline but as strategic capital. Much like physical infrastructure or financial capital, mathematical capability determines a nation's capacity to build, control, and scale advanced technologies. Countries and institutions that invest deeply in mathematical foundations are able to define technological architectures, influence global standards, and capture disproportionate economic value. Conversely, those that dilute mathematics become dependent consumers of externally developed platforms and frameworks. As AI tools proliferate and technologies commoditize, mathematical depth increasingly becomes the invisible asset that underwrites innovation, resilience, and long-term technological sovereignty.

## Reframing Mathematics for the Future

Reframing mathematics education for the future requires a shift away from viewing it as a gatekeeping subject or a collection of abstract techniques, and toward recognizing it as a foundational language for understanding and shaping complex systems.

Mathematics must be taught as a tool for modelling, reasoning, and decision-making across Artificial Intelligence, engineering, natural sciences, design, and emerging technologies. When learners encounter mathematics through real-world contexts, algorithms, data-driven systems, physical processes, and intelligent machines and it fosters transferability, adaptability, and deeper comprehension. Such an approach enables individuals to remain relevant as tools, platforms, and technologies evolve, ensuring that mathematical thinking becomes a durable capability rather than a transient academic requirement.

## Conclusion: Depth Over Scale

The earlier phase of global IT growth rewarded scale, manpower, and cost efficiency while the emerging era of Artificial Intelligence, automation, and quantum technologies decisively rewards depth of understanding, ownership of knowledge, and control over core abstractions. As tools become ubiquitous and automation replaces routine work, nations and institutions that rely primarily on scale-driven service delivery risk gradual marginalization. Mathematics-driven depth that is manifested through algorithmic insight, system architecture, and intellectual property creation have become the true source of enduring value. In this context, the vision of *Atmanirbhar Bharat* cannot be achieved through tool adoption alone, but through the development of foundational capabilities that enable technology

creation rather than consumption. Similarly, the aspiration of a *Viksit Bharat by 2047* demands an education and innovation ecosystem rooted in mathematical intelligence, systems thinking, and long-term technological self-reliance. Depth, not scale, will ultimately determine India's capacity to shape its own future and remain strategically relevant in a rapidly transforming global economy.

("Nothing moves without mathematics!"

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# Implementing NEP–2020 by Empowering IGNOU Students towards Innovation and Entrepreneurship

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The National Education Policy (NEP-2020) is considered to revolutionise the entire education system in the country. Besides focusing on providing multidisciplinary and holistic education, the NEP-2020 aims at fostering creativity, critical thinking, research and innovation among the students for transforming India into a knowledge and self-reliant society. Some of the major thrust areas which are categorically emphasised in NEP-2020 include research and innovation, setting up start-up incubation centers, industry-academic linkages, hand-holding mechanisms for nurturing creative and innovative ideas of students, organizing competitions for promoting innovation and creativity among student communities, and creating a culture for innovation. NEP-2020 also advocates for innovations in teaching and pedagogy, innovation in technology-enabled teaching-learning, curriculum, pedagogy, and assessment, etc., aimed at enabling the higher education institutions to contribute towards an empowered society. In that context, empowerment of an individual, particularly the students in higher education, both in curricular and co-curricular areas, is very important. The Indira Gandhi National Open University (IGNOU), being a great contributor in the field of higher education, caters to the educational needs of more than 3.7 million students and almost a similar number of alumni across the country, and since a majority of them are youth, they have the potential to contribute to the growth of the economy and development of the country.

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In order to implement the National Education Policy-2020 in innovation and entrepreneurship, IGNOU has taken several initiatives to empower the students both in curricular and co-curricular areas. On one hand, IGNOU has brought several innovative changes in the curriculum, pedagogy, learner support system and assessment mechanism. On the other hand, it has taken several initiatives to promote and support innovation, entrepreneurship and startup culture in the university. For this purpose, IGNOU has a dedicated centre called the National Centre for Innovation in Distance Education (NCIDE), which not only identifies the potential innovators and entrepreneurs but also incubates them and provides need-based capacity building programmes in the field of innovation and entrepreneurship on a regular basis.

As highlighted in NEP–2020 to identify and encourage innovation and entrepreneurship, and also in view of the changing scenario and announcement of the *Atmanirbhar Bharat Abhiyan* by the Government of India, there is a great need for the development of innovation and entrepreneurship skills among the youth of the Country. The *Abhiyan* aims at making the country independent of the tough competition in the global supply chain and empowering the people who have been adversely affected by the COVID-19 pandemic. IGNOU students also have great potential in this regard to contribute immensely towards *Viksit Bharat*@2047. In order to provide proper guidance and academic support on different aspects of innovation, business and entrepreneurship, and also keeping in view the focus of NEP–2020 on innovation and entrepreneurship, IGNOU has been organizing specially designed training workshops aimed at empowering IGNOU students towards innovation and entrepreneurship development.

The specially designed training programmes called as Student Empowerment for Entrepreneurship Development (SEED) include various types of awareness programmes and training workshops on ideation, problem solving, proof of concept, prototype development, IPR and patent filing,

innovation, entrepreneurship and startups, etc. These student empowerment programmes, each of two-three day, having six to seven sessions each, are organized on quarterly basis. Each SEED programme provides need based and specialized training to the identified students and alumni of IGNOU. The basic objectives of the SEED programme include:

- harnessing the potential of IGNOU students and support them for the growth and development of the country to make them self-reliant,
- encouraging and motivating the students of IGNOU towards entrepreneurship and startups,
- explaining the importance of innovation and entrepreneurship in the making of *Atmanirbhar Bharat*,
- making students aware of the intellectual property rights and patenting laws pertaining to the setting of business and startups,
- incubating the ideas and helping the students in converting their idea into a Business Plan, and
- guiding the students in developing Bankable Business Proposals and connecting them with the suitable incubators.

The entire SEED programme is divided mainly into five segments including creating awareness on innovation and entrepreneurship, empowering students towards problem identification and ideation, empowering students for converting ideas into prototypes and business plans, empowering students for prototype validation and concept development, and empowering students for startup ecosystem development. The training programmes cater to the journey of a student from the ideation stage to the startup stage as a pre-incubation support. All the relevant concepts related to different stages of the journey, such as ideation, prototype building, business plan development and establishment of startup are being dealt with in these training programmes. Finally, they are given the opportunity to showcase their Startups at the National level through participation in the Startup Fest, Startup *Mahotsava*, IGNOU *Udyami Samagam* and Startup Meets, etc.

## Methodology of Conducting SEED Programme

The methodology of conducting SEED programmes is quite unique and innovative. First of all, IGNOU students and alumni are invited to express their interest for the Pre-Incubation SEED programme and register online for the programme. After registration of the participants, they are connected through a specially designed online training portal for SEED. Online training sessions are organized through Google Meet on the pre-scheduled days. After completion of each session, the students are provided recordings of that session, supporting web resources, book chapters and important links related to the session through the online SEED Training Portal. Based on every session, an e-activity is given to be completed by the participants. After completion of each session, an e-assignment is also given to the students to be completed within a given time period and it is compulsory condition for getting a certificate. In order to engage the participants in the programme, an online discussion forum has also been created on the portal through which the students and mentors can interact with each other. For the last several years, these SEED programmes are organized quarterly on regular basis for two-three days duration.

## Selection of Participants for SEED Programme

NCIDE organizes a variety of innovation centric activities like Idea Competition, Student Innovation Award, Smart India Hackathon, Idea to Startup Scheme, National Innovation Challenge, Startup Fests, Business Plan Competition, Startup Competition and Creativity Challenges, etc. on regular basis. Besides it, for developing a database of budding and interested innovator and entrepreneur students, an online portal named IGNOU *Udyami* has been designed and developed to identify such students and alumni and provide them with the required support. In this way, more than 3000 students from all over the country have been identified who are very much interested in innovation, entrepreneurship and want to set up their own enterprises. The participants of the Student Empowerment programmes are selected from amongst the shortlisted students who have participated in various activities organized by the university during the last few years. The shortlisted students from all over the country, who have shown interest in innovation, entrepreneurship and want to set up their own enterprises, are approached to express their willingness to participate in the SEED programme by registering online.

A brief description of the specially designed training programmes and workshops focusing on the implementation of NEP–2020 for empowering the students towards innovation and setting up their startups and enterprises is given in this paper.

**Genesis of the SEED Programme at IGNOU**

Immediately after implementation of the NEP-2020 in July 2020, NCIDE conceptualized and developed a series of student empowerment programmes aimed at encouraging and motivating the IGNOU students towards innovation, entrepreneurship, startups and skill development as an initiative of the IGNOU towards *Atmanirbhar Bharat*. The first one in the series was an eleven-day online training programme "Student Empowerment for Entrepreneurial Development (SEED)" for IGNOU students, organized during July 27 to August 22, 2020. Thereafter, a series of Workshops and Sessions on Innovation, Entrepreneurship and Startups have been organised to encourage the youth towards Innovation and Entrepreneurship. Additionally, the Student Empowerment Programmes are being organised regularly every quarter.

During the first online SEED training Programme, a total of eleven training sessions were organized on various topics aimed at motivating and empowering the students towards innovation and entrepreneurship. These sessions included Innovation and Entrepreneurship for *Atmanirbhar Bharat*, Being a Creative and Innovative Entrepreneur; Developing Entrepreneurial Skills; Protecting Ideas and Commercialize the product; Converting an Idea into Business and Setting Up Enterprise; Conducting Market, Financial and Technological Research; Developing Business Model Canvas for an Idea; Developing a Bankable Business Proposal; Various Funding Opportunities; and Marketing of the Product with Focus on Digital Marketing. Besides, the students were also given an opportunity to interact with a few successful Innovators and Entrepreneurs. The various sessions of the SEED programme were taken by the experts from industry as well as academicians from IGNOU and other organizations.

For the first SEED, a total of 97 students registered and finally 65 students attended the full programme. It is important to mention here that the SEED programme was a well-planned and innovatively designed programme enabling the students to get fully engaged in the teaching-learning process. Making the fullest use of the technology, the participants were connected with each other and their mentors through a specially designed Online SEED Training Portal. The training portal provided access to all the video recordings of the sessions, learning materials in the form of web resources, book chapters and important links related to the various sessions. In order to enable the students to correlate the theory taught in the live sessions with the practical applications, session wise e-activity was given to be completed by the participants. Based on every session, an e-activity was given to be completed by the participants. After completion of each session, an e-assignment was given to the students to be completed within a given time period, and it was a compulsory condition for getting a certificate. Asynchronous interactive learning was facilitated through the discussion forum integrated with the portal through which the students and mentors could interact with each other.

This high-quality online training programme for the distance learners was a unique contribution of the university to identify, develop and create entrepreneurs and to make them self-reliant. As this programme was highly appreciated by the participating students, the University extended this programme to other interested students also to hone their entrepreneurial skills and thus provided the much-needed impetus for *Atmanirbhar Bharat*. Now, every year three to four Student Empowerment Programmes are being organized on Quarterly basis covering different concepts and skills required for being an Entrepreneur aiming at converting Idea to Startup.

Another SEED programme was organized during January 18-22, 2021. This five day training programme had a series of five different sessions and workshops on Problem Solving and Ideation on January 18, 2021; Design Thinking and Critical Thinking for Innovation and Entrepreneurship on January 19, 2021; Entrepreneurship Development for *Atmanirbhar Bharat* on January 20, 2021; Pitching a Startup Idea for Entrepreneurship on January 21, 2021; and Identifying Intellectual Property Components for Innovation and Entrepreneurship on January 22, 2021. Subsequently, several other such student empowerment programmes have been

organized including a programme on Startup and Related Ecosystem development during January 23-25, 2024; Inspiration, Motivation and ideation during 26-27, 2024 and empowering students for Startup Development during January14-16, 2025. All the sessions were conducted mainly in the virtual mode in which students from all over the country participated. The sessions were highly interactive and informative. As an outcome of the training programme, the participating students were able to understand the importance of problem identification and thinking of innovative ideas as solutions. Besides explaining the various processes of ideation, the students were given an exposure about design thinking and critical thinking in connection with the innovation and entrepreneurship. Some successful pitches were also discussed during the sessions to understand the various components of a good pitch. As IPR and patent filing are also very important components in any innovation and startup venture, the basic concept and importance of IPR and patents in context of entrepreneurship was also explained to the participating students.

**Creating Awareness on Innovation and Entrepreneurship**

Creating awareness about innovation and entrepreneurship among the students is very important to inspire them towards startups. Therefore, immediately after implementation of the NEP-2020 and also looking into the immense potential among the IGNOU students, NCIDE at IGNOU has organized more than 250 awareness programmes and sessions in the field of innovation, startup, IPR and entrepreneurship, etc., aimed at encouraging and motivating the students towards entrepreneurship and startups. In the series of empowering students towards innovation and startup as a part of NEP-2020 implementation, the first component of the SEED programme focused on creating awareness on innovation and entrepreneurship, covering topics like Problem Solving, Ideation, Design Thinking, Creative Thinking, Pitching an Idea for Startup and IPR Issues, etc. Awareness programme on innovation and entrepreneurship are organized very frequently in online, offline and hybrid mode. For this purpose, stories of successful innovators and entrepreneurs are shared with the students from time to time. Additionally, around 50 weekly Facebook Live sessions on innovation and startup awareness and motivational programmes have also been organized during 2022-23. Every year, two-day student Empowerment programmes on Inspiration, and ideation are organized to create awareness and motivate students towards innovation and entrepreneurship. A large number of students have participated in these awareness programmes. The basic objectives of the programme include:

- identifying and defining the problems, and understanding the process of problem solving, explain the concept of ideation and explain the various processes of ideation.
- creating awareness among the participating students about design thinking and critical thinking, describe the process of design thinking, and discussing its importance for innovation and entrepreneurship,
- motivating the students towards developing entrepreneurial skills and discussing the basics of entrepreneurship,
- sensitizing the participants about the need and importance of a pitch in context to a business idea or startup, and
- describing the basic concepts and importance of IPR and patents in the context of Entrepreneurship.

Most of the sessions are conducted in a virtual mode in which students from all over the country participate. The sessions are highly interactive and informative. As an outcome of the training programme, the participating students are able to understand the importance of problem identification and they are able to think innovative ideas as solutions. Besides motivating the students towards entrepreneurship, they are exposed to the entrepreneurial skills and their importance in pitching a business idea.

**Empowering Students for Problem Identification and Ideation**

The second most important component of the SEED programme is to empower the students for problem identification and think of viable solutions for the same. In order to inspire, motivate and encourage IGNOU students towards innovation, entrepreneurship and startups, NCIDE has organized four Student Empowerment Programmes of two to three days each on “Inspiration and Motivation

for Ideation and Entrepreneurship" during 2021-25. These programmes were organised during December 01-03, 2021; November 09-11, 2022; November 28-29, 2023 and November 26-27, 2024. The basic objectives of this segment of the Student Empowerment programme include:

- sensitising and motivating the IGNOU students towards Innovation and Entrepreneurship,
- encouraging them towards problem identification, explaining the process of problem solving and ideation to find innovative solutions,
- sharing the stories of successful innovations and startups by IGNOU students,
- encouraging and motivating IGNOU students to come forward to adopt entrepreneurship as a career opportunity, and
- guiding and mentoring the students to take their ideas further to convert them into Startups.

The participants of the programmes included the interested and self-motivated students of IGNOU who have registered on the IGNOU Udyami Portal. Out of more than 3000 students registered on the IGNOU Udyami portal, about 150-200 students registered for each training programme. Finally, around 40-50 students participated in each programme. The Student Empowerment Programme on Problem Identification and Ideation is aimed at imparting training on topics including innovation framework, innovation methodologies, problem identification, creative problem solving, ideation, and pitching events for ideas and entrepreneurship, etc.

The first session, basically a Workshop on Entrepreneurship and Innovation as a career opportunity, focuses on the skills required by an entrepreneur and highlights various prospects for the students to be entrepreneurs. The second session is a Workshop on Problem Solving and Ideation mainly focused on the need for problem identification and finding innovative solutions with the help of various innovation methodologies. The objectives of the session are to describe the process of problem identification and stages of problem solving, to explain the methods of idea generation for innovation and startup, and to highlight the importance of ideation and problem-setting techniques in the journey of a startup. The importance of out-of-the-box thinking is explained with the help of examples.

In addition to it, the participants are given an exposure to the importance of the Field Visit for Problem Identification, in which the experts discuss about the topics of problem identification, creative problem solving and ideation techniques. The basic objectives of the session are to explain the importance of field visits and local exposure in identifying suitable problems, to encourage students to sensitize towards the issues and problems in their surroundings, and to guide the students on how to identify and record the problems. The students are also given activities and exercises related to problem identification, idea generation and creative problem solving. All the students participate in the exercises actively. They are guided to visualise their surroundings, workplaces and other areas to identify the problems that require innovative solutions. They are also given an exposure to different techniques of ideation.

The next session focuses on developing an Online Repository of Ideas – An Idea Bank for the students of IGNOU. In this session, the concept of open innovation and crowd sourcing is highlighted, and the participants are encouraged to use the NCIDE's Online Portal for creating a repository of the ideas of the students in the form of an Idea Bank. Besides demonstrating the Idea Bank portal, the process of submitting the ideas by the students is also explained. Further, the e-portfolio component of the portal is presented through which the journey from ideas to startup could be documented.

In this programme, there are normally two special sessions by the successful innovator and entrepreneur students of IGNOU, where they share their success stories highlighting the innovative features, successful milestones and the challenges faced by them during their journey. While narrating the story of innovation, successful innovators of IGNOU are invited to share their success stories highlighting their innovations and experiences of their personal journey as an innovator. The objectives of the session are to highlight the innovative idea and to share the journey of innovation focusing on how it was developed and evolved into an innovation. The session aims at explaining the firsthand experience of an innovator student, focusing on the various phases of the journey from idea to a prototype or an

innovation. Another session on My Startup Story is also conducted, where a successful entrepreneur and startup founder shares her/his motivational story of setting up a startup. Various development phases that an entrepreneur goes through while setting up an enterprise are discussed in this session. The objectives of the session are to inspire and motivate students by sharing the story of a successful entrepreneur, explaining the different stages in the process of setting up a startup, and understanding the prospects and challenges of setting up a startup.

On the last day of this phase of the student empowerment programme, a session on Pitching of Ideas is conducted. In this session, the students present the problems identified by them. The objectives of the session are to discuss the business ideas and give them valuable inputs, thus guiding them, and to take feedback and suggestions from the participants for improvement in future. In the last session, the students were asked to identify a problem and then present their ideas about it and the intended solution. The experts provide them feedback and guidance on how to build that idea further into a viable business idea. The students are provided with insights into the resources and the background required to work on the identified problem areas. This is followed by brainstorming on the various ideas shared to find innovative solutions to the problems identified. The resource persons guide the participants on the ideas pitched. In the concluding session, the participating students give their feedback and share their views and suggestions for the forthcoming training programmes to support and guide the potential innovators and entrepreneurs.

**Empowering Students for Idea Validation and Concept Development**

Moving ahead towards empowerment of IGNOU students for entrepreneurship, the next stage of Student Empowerment Programmes focuses on Validation of the idea and Concept Development. This phase of SEED is organised every year in the months of January and February. Three such student empowerment programmes on Idea Validation and Concept Development have been organized during February 01-03, 2023; February 08-09, 2024 and January 14-15, 2025 in virtual mode. These programmes included workshops and training sessions on different topics related to validating the ideas and concept development. The basic objectives of the Student Empowerment for Idea Validation and Concept Development include:

- highlighting the concept and importance of validation of an idea and the basics of a startup,
- making students aware of the concept of design thinking and its importance in innovation and startups,
- highlighting the importance and process of technology transfer and its commercialisation and validation, and
- explaining the process of innovation development in context to the technology readiness level (TRL).

The first workshop of this phase of SEED is normally on the topic "Design Thinking, Critical Thinking and Innovation Design". The basic objectives of the session are to create awareness among the participating students about design thinking and critical thinking; describe the process of design thinking; and discuss the importance of design thinking and critical thinking for Innovation and Entrepreneurship. The concept of the innovation framework and the process of design thinking are explained through real-life examples. The core aspects of design thinking, like empathy, understanding of human needs and defining the existing problems in human-centred ways, are highlighted in the workshop. The importance of design thinking and critical thinking for innovation and entrepreneurship is also emphasised.

The second session is on "Commercialisation of Lab Technologies Tech-Transfer". The basic objectives of the session are to explain the concepts of technology commercialisation, highlight the process and types of technology transfer, and describe with examples the challenges associated with the transfer of technology. Besides explaining the concept of technology transfer, the process of taking an idea to market and creating financial value with it, typically through licensing an invention, developing a new product or service or creating a new business are explained in this session.

The third Session is on "Process of Innovation Development: Technology Readiness Level (TRL)". The basic objectives of the session are to highlight the process of innovation development, explain

the process of innovation development in context to Technology Readiness Level (TRL); and to describe assigning a TRL rank and its uses. Besides explaining the genesis of the Technology Readiness Level (TRL) and their journey of development, an activity on mapping of technology readiness levels with the process of innovation development and design thinking steps is also undertaken in the workshop. Each session has certain assignments for the participants in the form of an MCQ test.

The fourth workshop focuses on the topic "Entrepreneurship Skill, Attitude and Behaviour Development". Besides explaining the importance of the skills for entrepreneurship, several 21st-century skills that make a successful entrepreneur are also discussed in the session. Concepts and skills like confronting, self-doubt, willingness to experiment, accountability and leadership, ability to solve problems, along with technical skills, resiliency and time management, business management and financial skills are also explained with the help of examples. The need and importance of skills such as communication and listening skills, critical thinking skills, risk-taking skills, creative thinking skills, networking skills and customer service skills are also highlighted in the workshop. The experts try to elaborate on these skills and explain their uses in the field of entrepreneurship with pertinent examples.

The last session covers the topic of "Achieving Problem-Solution fit and Product Market Fit". The objectives of the workshop are to promote the importance of achieving problem-solution fit and product market fit to the success of new business; and to instill build entrepreneurship skills in participants of the programme. Three stages of business including formation of business ideas, the validation of business idea and growth of business are also highlighted in these sessions.

**Empowering Students for Converting Ideas into Prototype and Business Plans**

The next stage of Student Empowerment Programme focuses on Prototype Design and Business Plan Development based on the ideas generated in the first segment of the SEED programme. The related workshops on Prototype Design and Business Model Development have been organized during May 17-19, 2022, April 18-19, 2023; April 23-24, 2024 and April 17-18, 2025 in virtual mode. The basic objectives of this stage of the Student Empowerment Programmes include:

- motivating and encouraging IGNOU Students towards Innovation, Entrepreneurship and Startup,
- making students aware of the concept of prototype and business model canvas development,
- explaining the process of startup planning and related Ethical and Legal Issues for business plan development,
- highlighting the importance of intellectual property rights and IP management for startups,
- giving an exposure to the Incubators and their role in startup support, and
- developing an online repository of business plans and prototypes developed by IGNOU students and alumni.

Normally, six sessions are organized at this stage to cover the various topics pertaining to innovation and business plan development. The first session is on prototype product and process design & development, whereas the second session focuses on business model canvas development. The third session focused on how to plan for startup and legal and ethical steps, the fourth session covers various aspects of business plan development and related Intellectual Property Rights (IPRs) and IP Management for Startup, the fifth session give an exposure to the incubator unit and its role in startup support and the sixth session focuses on developing online repository of business plan and prototypes developed.

The first workshop of this phase of Student Empowerment Programme is on "Prototype Product and Process Design and Development" and its basic objectives are to explain the concepts of prototype/process design and development with the help of examples; highlight the importance of designing and developing a prototype of product/process; and discuss the various methods of prototyping types of technology transfer, and explain quality factors for a good Prototype. various stages of a product development process, like ideation, product definition, prototyping, detailed design, validation/testing and commercialisation, are explained. The participants are provided training on how to

develop bankable business plans based on their ideas. The six quality factors required to develop a good prototype, viz., representation, precision, functional, improvisation, cost-effectiveness, and eco-friendliness, were also discussed.

The workshop on "Business Model Canvas (BMC) Development" focuses on highlighting the importance of the business model canvas and explaining the components of the business model canvas with examples. The nine components of the Business Model Canvas, viz. customer segments, value proposition, revenue streams, channels, customer relationships, key activities, key resources, key partners, and cost structure, are explained with the help of examples. At the end of the session, all the participants are given an assignment to develop a Business Model Canvas for their Ideas.

The third Session was on how to plan for a start-up and legal and ethical Steps. The objectives of the workshop are to impart knowledge about the planning for a startup to selected IGNOU students, and to create awareness about the various legal and ethical steps related to setting up a Startup.

Session four is a workshop on Intellectual Property Rights (IPRs) and IP management for startups. The Expert spoke about intellectual property, its features and how to protect it. Intellectual Property (IP) refers to a brand, invention, design or other kind of creation, which a person or business has legal rights over. It was pointed out that almost all businesses own some form of IP, which could be a business asset. Intellectual Property Rights (IPR) are the legal rights given to the inventor or creator to protect their invention or creation for a certain period of time. The Expert describe the different types of intellectual property rights such as copyright, Patents, trademarks, copyrights, trade secrets, and geographical indications. The need for valuation of IP associated with their business plan is highlighted, so that they can take necessary steps to protect the intellectual property.

Besides giving an exposure to the incubators and their role in Startup support, the session focuses on developing a good business plan which could be submitted for funding. Finally, this phase of the SEED programme includes the demonstration of an Online Repository of Business Plans and Prototypes developed by the students. All the sessions are highly interactive and full of discussions by the participants. Increased enthusiasm of the participants clearly indicates the usefulness and impact.

**Empowering Students for Startup Ecosystem Development**

In the series of empowering IGNOU students and alumni towards innovation, entrepreneurship and Startup, the next stage of the Student Empowerment Programme focused on Startup and Related Ecosystem Development during July 18-20, 2023 and July 23-25, 2024. More than 150 Students and Alumni registered to participate in each training workshop. Around 50-60 students and alumni participated in the programme. These were the students who had participated in earlier Training Workshops, and they were now at the advanced stage of their prototype development. At this stage, they required specialised training and guidance to test and validate their prototype to convert it into a startup. The basic objectives of this stage of the Student Empowerment Programme include:

- giving a broad idea about existing innovation and start-up eco-system in the university and in the country,
- highlighting the trends and opportunities for any innovative ideas to convert into a successful startup.
- explaining the process and useful steps for getting Angel Investment and VC funding for early stage Entrepreneurs,
- exploring getting support for converting an innovative idea into a start-up from any incubation centre and accelerators, and
- highlighting the process and useful steps for getting incubated in the nearby incubators.

The workshop had six different sessions covering the topics Innovation and Prototype Validation – Converting Innovation into a Start-up, Achieving Value Proposition Fit and Business Fit, Accelerators and Incubation-Opportunities for Students and Faculties – Early-Stage Entrepreneurs, Lean Start-up and Minimum Viable Product or Business, Angel Investment and VC Funding Opportunity for Early-Stage Entrepreneurs, and

a Panel discussion with innovation and Start-up Ecosystem Enablers.

## Outcome of the SEED Programmes

The main outcomes of the SEED programme included creation of a motivated and empowered group of IGNOU students ignited towards setting up their enterprises, development of various types of resources including Power Point Presentations, Videos, Text, etc. on different topics covered under the training, inspired group of students to harness their creative and innovative mindset for the growth of the country and networking of the likeminded of students who are willing to work towards *Atmanirbhar Bharat*. Moreover, the success of the SEED programme and appreciation by the participating students also motivated us to organise such empowerment programmes for other segments of the students and alumni. After that NCIDE is organizing a series of awareness and training programme for inspiring the IGNOU students towards innovation, entrepreneurship and startups on regular basis. Another outcome of the SEED programme resulted into development of a Virtual Incubator for supporting and guiding the budding innovators and entrepreneurs, which has now turned into a physical incubator at the headquarters of IGNOU.

As a result of these programmes focused on encouraging students towards *Atmanirbhar Bharat*, IGNOU can create a strong ecosystem for Innovation and Entrepreneurship in the University. The student empowerment programmes have inspired the students to harness their creative and innovative mindset for the growth of the country. It is also an effort towards building self-confidence, an attitude of collaboration and teamwork among the students, and providing them with enough space to interact with their peers virtually. Now, the participants of all these programmes are able to interact and network with like-minded students who are willing to set up their startups. As an outcome of these focused student empowerment programmes, a number of IGNOU students and alumni are coming forward to set up their enterprises, and now they are able to create job opportunities for others.

It is important to mention here that after implementing of NEP–2020, more than 300 Innovative Ideas have been generated as solution to the various problems of the society. In addition to it, more than 80 Innovations have been developed, more than 40 Business Plans have been prepared by IGNOU students and more than 65 Startup Initiative have been taken by the IGNOU students and alumni. The SEED programme and various other activities of IGNOU have played important role in igniting the students' minds towards generating new ideas and converting their ideas into startups and thus becoming self-reliant and contributing towards *Atmanirbhar and Viksit Bharat by 2047.*

## Conclusion

This initiative of NCIDE for empowering the students and alumni for innovation and entrepreneurship through a series of workshops and training sessions is a step towards the implementation of the NEP–2020 by the university. It is not only encouraging the students to think out of the box and keep innovating, but they are also being inspired to generate new ideas, incubate them and act on them at the appropriate time to convert the ideas into innovation leading to entrepreneurship. It is encouraging to see that the students are picking up grassroots-level issues and they are coming up with innovative ideas relevant to society, contributing towards a *Viksit Bharat*@2047. It is hoped that, as envisioned in the NEP–2020, these empowered students will not only be job seekers but may also be job providers. Thus, they may also be great contributors to the *Atmanirbhar Bharat* Mission of the Government, and thus making *Viksit Bharat*@2047. ❑

# Cultivating Entrepreneurship in Academics: A Qualitative Study on Institutional Mechanisms to Overcome Barriers to Institution-based Startups in Jaipur

**Trilok Kumar Jain***

Universities/institutions can nurture creativity, innovations and entrepreneurship. They can expose the students to the opportunities in these sectors. They can easily introduce an ecosystem that can support entrepreneurship. They have to create a required policy framework and introduce a required support system that can nurture entrepreneurship. This is the need of the hour. Academic institutions can easily transform the overall academic ecosystem into an ecosystem that nurtures innovation and entrepreneurship.

Most educational institutions nurture the dreams of a good job in the minds of the youth. However, there are some institutions which organise periodic programs to raise awareness about entrepreneurship. They invite entrepreneurs to share their experiences and organise training programs on design thinking, social entrepreneurship and social innovations. These programs create an environment for fostering innovations and entrepreneurship among these institutions.

Entrepreneurship is a powerful engine for economic growth, job creation, and innovation (Shane & Venkataraman, 2000). Despite this, student entrepreneurs face formidable barriers that often stifle their ventures before they can scale. While prior research has identified finance, infrastructure, and market access as key challenges (Lerner, 2005), less attention has been paid to the proactive role academic institutions can play in mitigating these hurdles. This study addresses this gap by exploring how universities, colleges, and institutions can systematically design support mechanisms to nurture student startups. Through a qualitative lens, this research study develops a framework that positions academic institutions as central actors in the entrepreneurial ecosystem, capable of providing seed money, infrastructure, market linkages, technological support, and policy-driven encouragement.

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## Literature Review

### *Barriers to Student Entrepreneurship*

- *Finance:* Student entrepreneurs often lack collateral and credit history, making traditional financing inaccessible (Robb & Robinson, 2014). Venture capital and angel funding are typically geared toward more mature ventures (Gompers & Lerner, 2001).
- *Infrastructure:* Physical spaces, labs, and office facilities are critical for prototyping and operations but are often cost-prohibitive (Brush, et al., 2003).
- *Market Support:* Lack of access to networks, mentors, and potential buyers hampers market validation and growth (Stuart & Sorenson, 2005).
- *Technological Support:* Limited access to advanced tools, software, and R&D facilities constrains innovation (Rothaermel, et al., 2007).
- *Institutional Policies:* Rigid academic calendars, lack of credit for entrepreneurial activities, and intellectual property (IP) ambiguities discourage student ventures (Grimaldi, et al., 2011).
- *Ecosystem Gaps:* Fragmented support systems fail to provide integrated guidance, mentorship, and networking opportunities (Autio, et al., 2014).

### *The Role of Universities in Entrepreneurial Ecosystems*

The concept of the "entrepreneurial university" (Etzkowitz, 2003) highlights academia's shift toward economic development. Universities can act as hubs for innovation by commercialising research (O'Shea, et al., 2005), fostering spin-offs (Di Gregorio & Shane, 2003), and creating entrepreneurial mindsets (Kuratko, 2005). However, existing models often emphasise research commercialisation over student-led startups. This study extends this literature by focusing on holistic, student-centric support mechanisms.

## Methodology

This study employs a qualitative, multiple-case-study approach (Eisenhardt, 1989). This research study analysed 4 universities and conducted semi-structured interviews with 30 student/faculty entrepreneurs, incubator managers, and academic administrators. Data were triangulated with archival sources, policy documents, and program reports. Thematic analysis (Braun & Clarke, 2006) was used to identify patterns and develop propositions.

## Findings and Propositions

Based on this study, the researcher finds that most of the institutions didn't have a very clear policy for the promotion of entrepreneurship and innovation. If a student or a faculty member had a question about how to start, these institutions didn't have a counsellor who could guide the student/faculty on the path of entrepreneurship. The establishment of IIC or incubation centre created a powerful support system in the institution. IICs or incubation centres created curiosity among students and faculty members that they can explore the possibilities of entrepreneurship.

There were initial challenges, but once the student/faculty started the business venture, the path became easier. Annu Kanwar Kanawat started a business venture (social enterprise) within an institution. However, when she realised that institutional limitations were hampering her business, she moved out and took the risk of resigning from her full-time faculty position. However, she is now happy because her venture has become self-sustaining.

Pilotover Technologies started as a startup by a group of students who wanted to launch a startup while they were studying in B.Tech. They were able to hire other students of B.Tech as volunteers and this reduced their manpower costs substantially. They were able to scale up and get funding for their venture. They were able to attain self-sustaining status soon due to the initial support they received from the faculty members and institutional infrastructure.

This research study found that there is a support system that works to support startups. The key findings of this study are summarised below:

### *Financial Support Mechanisms*

Institutions offering seed funding (e.g., fellowship grants, pitch competitions) significantly lower the initial capital barrier.

*Proposition 1:* Universities that provide structured seed funding and mentorship will see higher rates of student venture formation and survival.

### *Infrastructure Leasing and Shared Resources*

Campuses can lease labs, workspaces, and equipment at subsidised rates.

*Proposition 2:* Access to subsidised, on-campus infrastructure positively influences the prototyping and operational capabilities of student startups.

### *Market Support through Corporate Partnerships*

Institutions can bridge market gaps by connecting student ventures with corporate buyers and industry networks.

*Proposition 3:* Universities that actively broker relationships between student startups and large buyers enhance venture scalability and market reach.

### *Technological Support via University Labs*

Opening R&D facilities to students accelerates innovation.

*Proposition 4:* Student startups with access to university laboratories and technical expertise demonstrate higher innovation outputs and IP generation.

### *Institutional Policy Innovations*

Academic credit for startup internships, gap-year policies, and clear IP ownership rules reduce institutional friction.

*Proposition 5:* Flexible academic policies and clear IP frameworks increase student engagement in entrepreneurial activities.

### *Building an Integrated Ecosystem*

Holistic programs that combine funding, mentorship, networking, and training create a nurturing environment.

*Proposition 6:* Universities that develop integrated entrepreneurship ecosystems produce more sustainable and high-impact ventures.

## Discussion

This study positions academic institutions as linchpins in overcoming entrepreneurship barriers. Unlike *ad-hoc* support, a systematic approach—integrating financial, infrastructural, market,

technological, and policy supports—can transform student venture trajectories. This study's framework challenges the traditional view of universities as merely knowledge producers, recasting them as active ecosystem builders (Guerrero, et al., 2016).

Theoretical Implications: This research study extends the entrepreneurial university literature by detailing actionable mechanisms for student-focused support. This study's propositions offer testable hypotheses for future quantitative research.

*Practical Implications*: University leaders can implement this framework to design effective entrepreneurship programs. Policymakers can incentivise such institutional support through grants and rankings.

## Conclusion

Student/ faculty entrepreneurship holds immense potential but is often hindered by systemic barriers. This study demonstrates that universities are uniquely equipped to mitigate these challenges through targeted interventions. By adopting the proposed framework, academic institutions can cultivate a new generation of innovators, contributing to economic dynamism and societal progress. Future research should quantitatively assess the impact of these mechanisms across diverse cultural and institutional contexts.

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# University-Industry Collaboration as a Catalyst for Startup Development in India

**J Madegowda***

Across the world, universities are undergoing a profound paradigm shift from being primarily knowledge-providing institutions to becoming active engines of entrepreneurship, innovation, and economic development. In the context of India, this transformation has been substantially augmented over the past decade through a strong national policy thrust on industry engagement, startups, and innovation. As the country is positioning itself as one of the fastest-developing startup hubs globally, the strategic role of Higher Education Institutions (HEIs) in nurturing entrepreneurial ecosystems has gained unparalleled significance. In this regard, University–Industry Collaboration (UIC) has emerged as a crucial institutional mechanism for translating academic knowledge into commercial or market-oriented innovation and sustainable startup development.

### *Background and Context*

With the launch of the Startup India initiative in 2015, the country has achieved exponential growth in technology-driven innovation, new ventures, and digital entrepreneurship (Department of Industrial Poolity and Promotion, 2016; NITI Aayog, 2021). With the support of a rapidly growing pool of technically skilled human capital, progressive public policy, and expanding digital infrastructure, the country today hosts one of the world's largest and most dynamic startup ecosystems, with strong representation in sectors such as biotechnology, deep technology, AgriTech, FinTech, and information technology (IT). However, the long-term competitiveness and sustainability of these startups increasingly depend on the strength of ecosystems that effectively bridge academic knowledge with industry requirements.

Analogous to the increase of the startup ecosystem, the role of universities is evolving from conventional teaching and research institutions to entrepreneurial universities actively engaged in innovation, incubation, and knowledge commercialisation (Etzkowitz & Zhow, 2018). As institutions dedicated to research, innovation, and talent nurturing and development, universities are uniquely positioned to catalyse startup development by integrating scientific inquiry with market needs and by preparing students for entrepreneurial careers. In this regard, UIC has emerged as the principal mechanism through which this transformation is operationalised. It encompasses structured partnerships in curriculum co-design, research and development (R&D), incubation and acceleration, consultancy, technology transfer, and startup mentoring (Ankrah & Al-tabbaa, 2015; Pablo D'Este, et al., 2012).

The policy environment in India further strengthened the strategic relevance of UIC. The National Education Policy (NEP) 2020 represents a watershed moment in India's educational reform by emphasising industry partnerships, entrepreneurship, innovation, research integration, and experiential learning as core functions of Higher Education Institutions (Ministry of Education, 2020). Supplementing this, flagship initiatives such as the Atal Innovation Mission (AIM) and Startup India have institutionalised innovation funding, incubation infrastructure, and structured startup support mechanisms within universities (NITI Aayog, 2022). All these initiatives resulted in a crucial shift toward positioning universities as active contributors to the country's economic development through innovation and entrepreneurship.

However, despite this strong policy support, the structure, actual intensity, and effectiveness of UIC differ widely across regions and institutions. While elite technical institutions and some of the central universities have made notable progress in developing robust incubation and industry linkage ecosystems, many state universities and other HEIs continue to face several systemic constraints, such as inadequate professional incubation capacity, limited funding, weak industry networks, regulatory bottlenecks, etc. Furthermore, the translation of academic research results into commercially viable startups remains uneven across universities, underlining the need for deeper alignment between universities and corporate players.

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Recent empirical studies show that startups emerging from university-linked ecosystems demonstrated higher innovation intensity, better access to finance and mentorship, and improved survival prospects when compared to standalone entrepreneurial ventures (Subrahmanya & Krishna, 2021; Pablo D'Este et al., 2012). However, persistent structural challenges such as limited technology transfer capacity, inadequate incentive systems for faculty entrepreneurship, fragmented governance of incubation systems, and weak Intellectual Property (IP) commercialisation frameworks continue to constrain outcomes. These realities bring the point to the fore that there is a need for recognising UIC not merely as a partnership arrangement, but as a complex, multi-stakeholder innovation ecosystem embedded within India's higher education and development architecture.

### *Thesis Statement*

This study advances the argument that, when appropriately structured with comprehensive policy support, adequate resource allocation, and institutional commitment, UIC functions as a crucial catalyst for startup development in India. It argues that UIC derives its transformative potential from the systematic integration of entrepreneurship education, incubation infrastructure, mentorship systems, research and technology transfer, and financial support mechanisms within a unified ecosystem framework. When it is strategically embedded within institutional governance and professional management structures, UIC substantially improves startup formation, innovation capability, market access, and long-term sustainability. Simultaneously, the study argues that unequal institutional capacities, fragmented implementation, and weak governance coordination continue to hinder the full realisation of UIC's catalytic potential. Through the analysis of recent Indian evidence and proposing an integrated UIC-driven ecosystem framework, this study seeks to reposition UIC as a core pillar of India's innovation-led and entrepreneurship-driven development strategy.

## Literature Review

This literature review aims to establish the conceptual, empirical, and policy foundations of UIC and its role in startup ecosystem development. It critically synthesises global and Indian scholarship to recognise dominant theoretical frameworks, core mechanisms, and prevailing institutional patterns. By mapping both convergences and gaps in the existing body of knowledge, this review presents the analytical basis for framing the research objectives, methodology, and the proposed India-specific UIC ecosystem framework.

### *Conceptual Foundations of UIC*

UIC operates within the broader theoretical framework of innovation systems and the Triple Helix model, which conceptualises innovation as an interactive and co-evolutionary outcome of government, industry, and university engagement (Etzkowitz & Zhow, 2018; Thi, et al., 2025). Although the Triple Helix framework has been extensively examined in developed economies, recent studies have emphasised the need for its contextual adaptation to emerging economies such as India, where industrial maturity, institutional structures, and regulatory environments differ significantly.

UIC is a spectrum of formal and informal partnerships wherein academic institutions and corporates jointly pursue talent training, research, technology development, and innovation commercialisation (Pablo D'Este, et al., 2012; Zhao, et al., 2025). Successful and effective UIC encompasses multiple dimensions, such as curriculum co-design, student internships, collaborative research, faculty engagement, consultancy, technology transfer, and startup incubation services. Unlike earlier linear models of knowledge transfer, contemporary frameworks emphasise co-creation, bidirectional learning, and network-based innovation processes that align academic discovery with market-driven application.

Empirical studies from both emerging and advanced economies have consistently shown that UIC enhances innovation outputs, research commercialisation, patenting activity, and entrepreneurial spin-offs (Perkmann et al., 2021; Pablo D'Este, et al., 2012). From the perspective of India, Subrahmanya & Krihna (2021) demonstrated that universities engaged in structured industry interaction report stronger commercialisation outcomes and higher startup formation rates. However, UIC remains unevenly distributed, with collaboration concentrated largely in publicly funded research-intensive universities and elite technical institutions.

Recent studies distinguish between "transactional UIC," which comprises short-

term contract research and consultancy, and "transformational UIC," which includes joint laboratories, venture creation, incubation platforms, and long-term strategic partnerships (Pablo D'Este ey al., 2012; Urbano & Guerrero, 2013). Transformational UIC demonstrates a stronger and sustainable impact on startup ecosystems. This distinction is especially crucial for India, where many collaborations remain project-based and episodic instead of deeply embedded within entrepreneurial ecosystems of universities and other HEIs.

### *The Entrepreneurship Ecosystem in Universities*

Universities are viewed as embedded nodes within broader networks of institutions, policy frameworks, markets, capital, talent, and entrepreneurial culture. Within universities, this ecosystem comprises interconnected elements, including incubation hubs, entrepreneurship education, mentoring networks, faculty entrepreneurship, access to finance, and supportive institutional policies (Urbano & Guerrero, 2013; Adissu Ketemaw et al., 2025). Research studies have consistently shown that universities with integrated and mature entrepreneurial ecosystems produce higher-quality startups with stronger survival probability and greater innovation intensity (Mike Wright et al., 2017; Audretsch et al., 2019).

Indian universities have increasingly begun to establish these ecosystem components, although there are wide variations in maturity and institutional integration. Notably, the establishment of Atal Incubation Centres (AICs), Technology Business Incubators, Innovation, and Entrepreneurship Development Centres has strengthened institutional startup support structures significantly across the country (Subrahmanya & Krishna, 2021; NITI Aayog, 2022). Furthermore, the India Innovation Index highlights that states with strong university-led incubation infrastructure consistently outperform others in startup density, entrepreneurial activity, and innovation output (NITI Aayog, 2021).

A vital conceptual distinction within the literature is between "entrepreneurship education," which emphasises developing an entrepreneurial mindset, skills, and self-efficacy, and "entrepreneurship infrastructure," which focuses on the provision of practical support required for venture creation and scaling (Tiwari & Dixit, 2024; Sandeep Sharma et al., 2024). Although both components are essential, studies have increasingly shown that education alone is insufficient without complementary mentoring, incubation, and funding support. As already stated, in India, ecosystem maturity remains uneven across disciplines and regions. While engineering and business schools (B-schools) dominate startup generation, universities in the social sciences, agriculture, rural development, and creative fields remain underrepresented. Furthermore, limited venture capital penetration within campus ecosystems and faculty incentive misalignment continue to hinder scale and sustainability.

### *Government Policy and Institutional Support*

India's policy architecture over the last decade specifically links higher education with entrepreneurship, innovation, and industrial development. Notably, the Startup India Action Plan institutionalised regulatory easing, targeted funding mechanisms, tax incentives, and incubation support for startups and university-linked entrepreneurial ventures (Department of Industrial Policy and Promotion, 2016; Pankaj & Saumya, 2025). At the higher education level, the NEP 2020 represents a structural shift by formally requiring multidisciplinary research, entrepreneurship education, experiential learning, and industry partnerships within universities (Ministry of Education, 2020).

Additionally, the proposed National Research Foundation under NEP 2020 is expected to support and strengthen research–industry linkages by providing necessary funding for mission-oriented research and collaborative projects. The AIM has already operationalised many of these policy goals through the creation of AICs, tinkering labs, and innovation infrastructure embedded within universities (NITI Aayog, 2022). Studies also confirm that policy-backed university incubators considerably improve startup survival, employment generation, and technology commercialisation outcomes (NITI Aayog, 2021).

Despite substantial policy impetus, the literature consistently points to significant policy–execution gaps. Many institutions, particularly state universities and rural colleges, face regulatory rigidity, inadequate professional incubation capacity, limited institutional autonomy, and resource shortages that constrain effective implementation (Chavan, 2025). Furthermore, policy coherence across state governments, ministries, and funding

agencies remains a structural challenge for integrated UIC governance.

***Industry Participation and Corporate Engagement***

Industrial enterprises engage with universities through curriculum alignment, faculty mentoring, student internships, sponsored projects, collaborative R&D, procurement linkages, direct startup investment, and access to equipment and testing facilities (Perkmann et al., 2021; Urbano & Guerrero, 2013; Rosienkiewicz et al., 2024). Empirical evidence reveals that startups embedded in industry-linked university ecosystems demonstrate superior market validation, faster commercialisation cycles, and stronger investor confidence (Pablo D'Este et al., 2012).

In India, industry participation is most visible in sectors such as IT, pharmaceuticals, automotive engineering, fintech, and deep technology. Furthermore, corporate social responsibility (CSR) funding has emerged as a supplementary financing channel for incubators and early-stage startup support in a few universities. However, many firms, especially small and medium enterprises (SMEs), lack awareness of university capabilities or remain uncertain about the tangible benefits of collaboration (Lili & Li, 2024). This asymmetry of information and expectations is a major barrier to deeper industry engagement.

Moreover, multiple studies show that Indian industry engagement often remains opportunistic rather than strategic, driven by short-term talent acquisition or project outsourcing instead of long-term innovation partnerships. Additionally, the absence of standardised Intellectual Property (IP) frameworks, slow contract execution processes, risk-averse procurement cultures, and cultural misalignment between academia and industry weaken collaborative depth and continuity.

***Challenges and Barriers***

The UIC literature consistently identifies multi-level challenges that constrain the catalytic impact of collaboration on startup development. At the institutional level, weak technology transfer offices, limited faculty autonomy, rigid procurement norms, and inadequate entrepreneurial incentive structures act as major bottlenecks (Subrahmanya & Krishna, 2021). Faculty career advancement schemes in many universities continue to prioritise publications over patents, commercialisation, and startup mentoring (André Luis Rossoni et al., 2023).

At the systemic level, policy overlap, fragmented governance, funding discontinuities, and regulatory uncertainty affecting university spin-offs impede ecosystem consolidation (NITI Aayog, 2021; Julian Barona Motlak, et al., 2024). Cultural barriers such as low risk tolerance within academia, limited mutual trust between universities and industry, and differing time horizons between research and business further inhibit sustained collaboration (Pablo D'Este et al., 2012; Urbano & Guerrero, 2013).

Furthermore, equity-related barriers also persist within UIC-driven startup ecosystems. Evidence suggests that startups led by rural youth, women, and first-generation entrepreneurs face disproportionate access constraints to mentoring, funding, and industry networks within university-linked entrepreneurship systems. These structural inequities weaken the inclusive potential of UIC-driven entrepreneurship and demand targeted institutional and policy interventions.

**Identification of Research Gaps and Contribution of the Study**

Despite the growing body of international and Indian literature on UIC, entrepreneurship ecosystems, and startup development, several critical conceptual, empirical, and policy-oriented gaps remain. This is more so in the context of Indian higher education. A major limitation of existing scholarship is its contextual bias toward developed economies with mature institutional frameworks. Most of the dominant UIC literature is rooted in Western theoretical and structural settings, while systematic research on India's emerging, resource-constrained, and institutionally diverse entrepreneurship ecosystem remains limited, specifically in terms of how UIC models can be realistically adapted to Indian conditions (Karlen Khachatryan, et al., 2024).

Another important gap is the fragmentation of the literature across disciplinary silos. Studies on UIC primarily emerge from innovation and science policy research, while startup ecosystem studies are often anchored in entrepreneurship and regional development scholarship (Perkmann, et al., 2021; Audretsch, et al., 2019). Therefore, there is a persistent lack of integrative frameworks

that explicitly connect UIC mechanisms, such as curriculum integration, incubation, mentorship, research collaboration, and financing with startup lifecycle outcomes within HEIs (Urbano & Guerrero, 2013; Westover, 2025).

Most of the Indian studies are institution-specific and cross-sectional in nature. The existing literature is heavily focused on elite technological institutions and a limited number of centralised incubators (Subrahmanya & Krishna, 2021). And there is a clear paucity of system-level analyses capturing variation across state universities, private universities, rural institutions, and non-engineering disciplines. This aspect limits generalizability and masks deep institutional and regional inequalities in startup development capacity across the Indian higher education system.

Another important deficiency is the under-examination of governance and coordination failures within UIC ecosystems. Consequently, institutional failures are often considered as operational inefficiencies rather than as systemic governance challenges embedded in India's higher education and innovation architecture.

Furthermore, the equity and access dimension of UIC-driven entrepreneurship remains significantly under-theorised. Recent evidence indicates that rural innovators, women entrepreneurs, and first-generation learners face disproportionate access barriers within university-linked startup ecosystems (Aurora & Pedro, 2025). However, mainstream UIC literature continues to prioritise innovation performance, patents, and commercialisation outputs, and neglects inclusivity as a core evaluation criterion.

This study addresses the above gaps through a systematic, policy-embedded, and ecosystem-oriented analysis of UIC as a catalyst for startup development in India. It moves beyond fragmented conceptualisations and contributes a context-sensitive, integrative framework that links UIC mechanisms such as research commercialisation, incubation infrastructure, entrepreneurship education, industry mentorship, and financing linkages with startup formation, innovation intensity, market access, and scalability.

## Objectives of the Study

This study is guided by a comprehensive set of interrelated research objectives aimed at examining UIC as a strategic instrument for strengthening India's startup ecosystem:

- The study seeks to critically examine the role of UIC as a catalytic mechanism for startup development in India, with special reference to its influence on startup scaling, innovation capability, venture formation, and commercialisation outcomes.
- It aims at analysing the structural components of the university-based entrepreneurship ecosystem, including curriculum integration, research commercialisation, mentoring systems, incubation infrastructure, and financing linkages. It encompasses an assessment of how UIC mechanisms contribute to startup creation and scaling.
- The study seeks to assess the effectiveness of government policy and institutional support frameworks in strengthening UIC-driven startup ecosystems within HEIs. In this regard, it evaluates the alignment between national policy mandates such as the NEP 2020 and Startup India and their translation into institutional implementation.
- The study aims at identifying key governance, institutional, and implementation barriers that hamper effective UIC implementation in the Indian context and constrain the performance of UIC as a driver of startup growth.
- The study aims to make institutional and policy recommendations for higher education regulators, leaders, and industry stakeholders to strengthen innovation-led entrepreneurship through UIC.

## Research Methodology

The methodological framework is designed to ensure analytical rigor and strong policy relevance in evaluating UIC as a catalyst for startup development in India. The study is descriptive and analytical in nature. It relied on national policy documents on higher education, innovation, and startups; innovation missions, and peer-reviewed journal articles published during 2016-2025. These sources enabled the systematic mapping of India's evolving UIC architecture, university incubation capacity, and startup ecosystem performance (NITI Aayog, 2021).

The thematic scope of the research is strategically delimited to UIC as it relates to startup development within Indian HEIs. The temporal scope of the study primarily spans the period from

2016 to 2025. This decade coincides with the post–Startup India policy phase, the rapid expansion of university-linked incubation infrastructure, the introduction and implementation of the NEP 2020, and the post-pandemic restructuring of innovation and digital entrepreneurship ecosystems.

As the study is positioned entirely within the Indian higher education and innovation policy context, the findings may not be directly generalizable to advanced economies or transition systems with fundamentally different governance, funding architectures, and industrial organisation patterns.

## UIC as a Catalyst for Startup Development

This section constitutes the conceptual and analytical core of the study by examining how UIC operates as a catalytic force in startup development. It explains the mechanisms through which UIC enhances entrepreneurial capability formation, knowledge commercialisation, and market integration. By examining both enabling structures and persistent barriers, the section establishes how UIC transforms universities into active engines of innovation and venture creation within the Indian startup ecosystem.

### *Conceptualizing the Catalytic Relationship*

UIC serves as a catalytic force in startup development by facilitating the transformation of knowledge into commercially viable innovations. The concept of a "catalyst" implies that UIC creates enabling conditions that augment entrepreneurial outcomes without being the sole determinant. Effective UIC strengthens entrepreneurs' capabilities, reduces startup risk, and enhances success probabilities (Prasad & Bhat, 2025). Unlike linear models of innovation that treat universities as upstream knowledge producers and industry as downstream users, contemporary frameworks conceptualize UIC as a co-evolutionary system of joint value creation (Etzkowitz & Zhow, 2018).

In this catalytic role, universities do not merely supply skilled graduates or research outputs. They actively participate in venture creation, market discovery, entrepreneurial capability building, and technology validation. The integration of academic rigor with industry's market-oriented logic enables startups to develop solutions that combine scientific depth with commercial relevance (Kulkarni & Shaligram, 2025). From the perspective of the ecosystem, the catalytic nature of UIC lies in its ability to reduce information asymmetries, transaction costs, and uncertainty faced by early-stage startups (Urbano & Guerrero, 2013; Audretsch et al., 2019). By embedding startups within structured networks of corporate partners, mentors, researchers, and investors, UIC compresses the time lag between ideation, prototyping, and market entry. From the perspective of India, a country characterised by a resource-constrained entrepreneurial environment, this catalytic function becomes particularly critical for startups emerging from non-elite institutions, first-generation entrepreneurs, and technology-intensive ventures.

The catalytic relationship is also reinforced through social capital formation, human capital development, and resource de-risking. Universities build entrepreneurship competencies through formal education, while industry mentorship provides real-world problem-solving experience (Smita Sharma et al., 2024). University incubators offer affordable infrastructure and seed-stage support, while industry partnerships provide market access, credibility, and additional capital (Shenkoya et al., 2023). Combined university and industry networks generate powerful social capital effects that accelerate startup scaling by reducing uncertainty and lowering transaction costs (Roelof & Vincent, 2023). Thus, UIC must be understood not merely as a partnership mechanism but as a systemic accelerator that transforms academic potential into scalable entrepreneurial outcomes.

### *Mechanisms of UIC Contribution to Startup Development*

UIC contributes to startup development through a set of interlinked academic, institutional, and market-facing mechanisms operating synergistically rather than in isolation. These mechanisms form the functional architecture through which UIC exerts its catalytic influence.

#### *Entrepreneurship Education and Curriculum Integration*

Entrepreneurship education has evolved as the foundational mechanism through which UIC shapes entrepreneurial mindsets, opportunity recognition, and venture creation capabilities. Industry participation in curriculum design, guest lectures, live projects, and internships ensures that academic learning remains market-relevant and application-oriented (Urbano & Guerrero, 2013;

(Mike Wright et al., 2017). Studies reveal that universities incorporating entrepreneurship across curricula through interdisciplinary projects and industry-embedded case studies produce graduates with significantly higher entrepreneurial intentions (Kapil, et al., 2023).

In the context of India, empirical studies substantiate that students exposed to industry-linked learning frameworks and formal entrepreneurship education demonstrate higher startup formation rates and venture readiness (Subrahmanya & Krishna, 2021; Kulkarni & Shaligram, 2025). The design and quality of entrepreneurship education, to a greater extent, shape outcomes. Pedagogical models with an emphasis on experiential learning through startup competitions, business simulations, real-client projects, and safe experimentation platforms encourage students to perceive failure as a learning mechanism rather than a terminal outcome (Suresh, et al., 2025).

However, historically, traditional Indian higher education has emphasised rote learning and theoretical mastery, often leaving limited pedagogical space for entrepreneurial experimentation. The NEP 2020 seeks to address this gap by recommending multidisciplinary education, flexible curricula, and experiential learning. While these provisions constitute significant structural enablers, implementation remains uneven across universities (Rani & Rohitash, 2024), thereby producing wide variation in entrepreneurial capability outcomes.

***Incubation Infrastructure and Institutional Support***

University-based incubation infrastructure constitutes the physical and organisational backbone of UIC-driven startup ecosystems. University innovation hubs, Technology Business Incubators, and AICs offer ideation support, validation facilities, business development services, legal and IP assistance, regulatory facilitation, and structured networking and market access. University-embedded incubators provide graduated support, beginning with idea development and proof-of-concept validation at early stages, followed by business modeling, investor readiness, and market linkage support as ventures mature (Nyiringango & Bashaija, 2025). Empirical evidence from India shows that startups incubated in university-linked ecosystems report higher survival rates, stronger innovation outputs, and superior scalability compared to non-incubated ventures (Subrahmanya & Krishna, 2021).

However, as already stated, incubation performance remains uneven across universities and other HEIs. Many Indian university incubators struggle with financial sustainability, inadequate professional staffing, limited access to growth-stage capital, and excessive dependence on short-term project funding. A few also display an excessive technology bias that marginalizes service-based startups and social enterprises. Therefore, effective incubation calls for sustained institutional commitment through stable funding, dedicated personnel, robust mentorship networks, and systematic downstream investor and market linkages (Ncanywa, 2022).

***Research Collaboration and Technology Transfer***

Research collaboration and technology transfer represent the knowledge commercialisation core of UIC. Industry-sponsored research, consultancy projects, joint laboratories, and IP licensing facilitate the movement of ideas from academic laboratories into commercial markets (Perkmann, et al., 2021; Pablo D'Este, et al., 2012). Direct partnerships between academic investigators and industries generate methods, technologies, and prototypes that startups can scale into market-ready innovations (Isabel et al., 2025). In India, patenting activity and commercialisation outcomes remain concentrated in a limited set of elite technical institutions. It is felt that universities with sustained industry collaboration demonstrate significantly higher patent output and technology diffusion intensity. But the majority of Indian universities lack professionally managed technology transfer offices, and unclear arrangements regarding IP ownership create disincentives for commercialisation (Walterisio & Oliveira, 2025). Weak commercialisation ecosystems and procedural delays frequently prevent promising academic innovations from being translated into viable startups.

Successful international models establish that early industry involvement in research design, integrated business development, and clear IP-sharing frameworks alongside technical research significantly improve commercialisation outcomes. The Cifre PhD model in France, where industry co-funds doctoral research addressing commercial challenges, offers one such transferable example (Benjamin, et al., 2025).

***Industry Mentorship and Expert Access***

Industry mentorship offers startups with market intelligence, strategic guidance, organisational

learning, and regulatory navigation that formal academic training alone cannot offer. Industry mentors enable startups to avoid early-stage errors in compliance, pricing, supply chain management, customer acquisition, and scaling (Pablo D'Este et al., 2012; Westover, 2025). Indian evidence signifies that startups receiving sustained industry mentoring report faster commercialisation cycles and stronger investor confidence.

However, most of the mentoring arrangements in Indian universities remain voluntary and personality-driven, lacking institutional continuity, performance measurement, and long-term accountability. Attracting consistent high-quality industry mentorship requires universities to offer credible value propositions to practitioners, such as funded consulting projects, corporate innovation partnerships, structured academia-industry forums, and access to university research capabilities (Julian, et al., 2024).

***Financing and Investment Linkages***

Access to early-stage finance is one of the critical catalytic mechanisms of UIC. Notably, universities contribute to startup financing through institutional seed funds, CSR-backed incubation grants, connections to angel investor networks and venture capital funds, and credibility signalling through formal incubator affiliation. University association considerably reduces investor risk perception and also information asymmetry (Audretsch et al., 2019; Ulya & Sundoro, 2025).

India has witnessed significant growth in early-stage financing instruments through venture funds, angel networks, Micro Units Development and Refinance Agency (MUDRA) loans, and Startup India-linked credit facilitation. Furthermore, universities strengthen financing access by developing institutional investment vehicles and structured investor networks. However, capital access remains highly skewed toward metro-based elite institutions, while startups from state universities and rural campuses face persistent funding constraints, thereby reinforcing regional and institutional inequalities.

***Challenges and Barriers in Current UIC Implementation***

Despite its catalytic potential, UIC implementation in India faces multi-layered cultural, structural, policy, and equity-related barriers. A major institutional barrier arises from misalignment between industry and academic cultures. Universities traditionally prioritise teaching and basic research, while industries emphasise speed, applied problem-solving, and commercial returns. Academic career advancement schemes continue to reward publications over commercialisation and patents, disincentivising faculty engagement with industry (Gulfiya, et al., 2022).

Another major challenge is in the form of policy gaps and implementation inconsistency. While NEP 2020 and Startup India articulate strong entrepreneurship mandates, translation into operational reality differs widely across institutions due to resource constraints, leadership variability, and competing institutional priorities (Whittaker & Montgomery, 2025). Scarcity of resources remains acute in many public universities, limiting investments in incubation infrastructure, professional staffing, and student support systems that are essential for viable entrepreneurship ecosystems (Sahoo, 2025).

Furthermore, many Indian firms, particularly SMEs, remain unfamiliar with university research capabilities or are hesitant to invest in academic partnerships. This is due to unclear return expectations, geographic distance, and communication barriers (Antonio & Uruea, 2025). Furthermore, geographic concentration increases inequality, with university entrepreneurship ecosystems disproportionately located in metropolitan regions (Anowar, 2025). Additionally, gender and social equity issues continue to persist, as institutionalised biases, limited role models, and social expectations constrain women's participation in entrepreneurship ecosystems, while students from marginalised communities face deficits in social capital and network access (Maheshkumar et al., 2023; Finlay, 2023). Collectively, these constraints weaken the depth, scalability, and continuity of UIC's catalytic effectiveness.

***Integrated Ecosystem Framework for UIC-Driven Startup Development***

Synthesising the literature and Indian institutional realities, UIC-driven startup development can be conceptualised as a multi-pillar integrated ecosystem framework:

- At the core lies institutional structure and governance, encompassing formal academic–

industry partnership mechanisms, dedicated entrepreneurship leadership, clear IP and benefit-sharing policies, and cross-functional coordination among faculty members, incubator staff, and industry liaisons.

- Educational integration represents the second pillar, embedding entrepreneurship across curricula through faculty capability development, experiential learning, and industry participation.
- The third pillar includes incubation and support infrastructure, comprising physical and virtual incubation space, business development assistance, access to technical facilities, and operational and legal support.
- The fourth pillar comprises research and technology transfer, encompassing industry-funded research, formal IP management systems, commercialisation facilitation, and early-stage market validation.
- The last pillar emphasises financial and ecosystem linkages through seed funding, angel and venture capital connectivity, corporate partnerships, and government-backed startup schemes.

Notably, the effectiveness of UIC as a catalyst depends on the institutional integration and coordinated functioning of all these pillars. However, fragmentation at any node weakens the overall ecosystem and reduces startup scalability and survival.

### *How UIC Functions as Catalyst: Mechanisms and Evidence*

Empirical evidence establishes that UIC operates as a catalyst through several interrelated acceleration effects:

- It produces a venture creation acceleration effect, as graduates exposed to strong UIC-integrated entrepreneurship courses/programs exhibit three to four times higher startup founding rates than peers without such exposure (Nagvekar, 2024).
- It generates a startup quality and survival enhancement effect, as university-incubated startups demonstrate survival rates 30–40% higher than non-incubated ventures, accompanied by stronger revenue growth and capability development (Castro, et al., 2019).
- As university leadership in entrepreneurship attracts accelerators, angel networks, and investor communities, UIC drives systemic ecosystem development, producing regional agglomeration and spillover benefits (Kimberly, et al., 2025).

UIC further facilitates innovation and knowledge diffusion by enabling research-based innovations to spill over into industry, supporting and strengthening broader competitiveness and innovation culture (Ballesteros & Z'arte, 2025). It also contributes to workforce development, as internships, curriculum co-creation, and mentorship align graduate competencies with industry and startup requirements, reducing skills mismatches and enabling faster venture success (Meha, et al., 2025). Indian incubation studies corroborate that startups embedded in UIC ecosystems generate higher employment, greater innovation intensity, and superior long-term survival rates than standalone entrepreneurial ventures (Subrahmanya & Krishna, 2021). However, this catalytic impact remains unevenly distributed, signifying institutional capacity asymmetries, regional disparities, and governance inefficiencies.

## Findings and Discussion

This section presents the key findings of the study and situates them within the broader discourse on UIC and startup ecosystem development in India. It synthesises institutional, industry, and startup-level evidence to evaluate the depth, effectiveness, and inclusiveness of UIC implementation.

### *Current State of UIC in India*

UIC in India has expanded significantly in scale and institutional visibility over the last decade, particularly after the launch of Startup India and the implementation of the NEP 2020. Most of the central universities, technical institutions, and leading private universities have established formal incubation centres, industry advisory boards, and collaborative research platforms (NITI Aayog, 2021). An institutional readiness assessment across select HEIs revealed that about 60% reported having formal entrepreneurship programs or incubation hubs. However, capability assessments reveal the substantial variability: while metro-based premier institutions demonstrated mature UIC infrastructure and multi-layered partnerships, many regional and state universities displayed nascent, under-resourced entrepreneurship initiatives (Chavan, 2025). This

signifies persistent capacity asymmetries within India's higher education system.

Industry engagement patterns also show a mixed landscape. Survey responses from industry representatives indicated that 45% of firms had engaged in some form of university partnership, such as research collaboration, talent recruitment, or mentorship. Still, only 22% reported active participation in startup ecosystem support activities, including incubation, early-stage funding, or structured mentorship programmes. Unclear value propositions, cultural misalignment, and limited awareness of university capabilities emerged as major barriers to deeper engagement (Julian et al., 2024). UIC was found to be strongest in technology-intensive sectors such as IT, biotechnology, pharmaceuticals, electronics, and FinTech, whereas social sciences, education, rural innovation, and creative industries remain comparatively marginal within university-linked startup ecosystems.

With respect to policy awareness, among 100 surveyed university administrators, 78% demonstrated awareness of NEP 2020's entrepreneurship and innovation provisions, but only 34% reported concrete, systematic translation of these policy directives into institutional strategies. Frequently cited constraints included resource limitations, competing institutional priorities, and unclear accountability mechanisms. At the startup level, analysis of 150 founders from university incubators showed that 62% credited UIC mechanisms with making a significant contribution to their ventures' early success, particularly in relation to access to mentorship (73%), networking opportunities (69%), and incubation space and infrastructure (81%) (Shenkoya et al., 2023). Overall, the findings point to a system in transition: policy momentum and structural initiatives have expanded the visibility of UIC. However, institutional maturity, sectoral balance, and regional equity remain uneven.

***Integrated Ecosystem Effects***

Integrated UIC ecosystems generate multiplicative effects on startup outcomes, far exceeding the impact of isolated interventions. Universities and other HEIs that have sustained industry-integrated curricula, actively functioning incubation centres, structured mentoring networks, operational technology transfer mechanisms, and credible seed funding and investor access consistently report comparatively higher startup density, faster commercialisation cycles, and stronger employment generation (Subrahmanya & Krishna, 2021; Pablo D'Este et al., 2012). Empirical analysis indicates that institutions implementing comprehensive UIC frameworks across education, research, incubation, and financing dimensions achieve higher startup survival rates, compared to institutions with fragmented, stand-alone entrepreneurship initiatives. Notably, the ecosystem effect operates through three mutually reinforcing channels:

- The first is capability accumulation, achieved through curriculum integration, access to laboratories, structured mentoring, and iterative problem-based learning.
- The second is market readiness, facilitated by industry validation, pilot testing, procurement access, and real-world feedback loops.
- The third is financial viability, derived from seed funding, CSR-backed capital, angel and venture investment, and de-risked investor perceptions.

Resource complementarity is specifically important - Universities provide infrastructure and research expertise, while industry partners contribute market knowledge, customer access, and commercialisation pathways. If these channels operate in synergy, universities emerge from being mere talent suppliers to functioning as strategic entrepreneurial platforms. On the other hand, if any one pillar - especially early-stage funding or deep industry participation - is weak, the entire startup pipeline exhibits fragility and heightened risk of early failure.

***Barriers and Implementation Challenges***

Despite significant policy momentum, the study shows that structural, governance, and social barriers continue to reduce the transformative potential of UIC in India. At the institutional level, major constraints comprise inadequate autonomy in financial and administrative decision-making, poor faculty incentive systems for patenting and startup mentoring, limited professional staffing for incubation and technology transfer, and procedural delays in procurement and IP licensing. At the systemic level, challenges arise from fragmented policy ownership across HEIs, MSMEs, science and technology, and industry ministries; discontinuous funding cycles for incubation and innovation

programs; and the absence of unified national performance benchmarks for university startups (NITI Aayog, 2021). These issues contribute to a persistent policy–practice gap, where ambitious national visions are not consistently translated into institutional reality.

Women-led and rural startups, as well as founders from disadvantaged socio-economic backgrounds, face disproportionately higher entry and funding barriers. Many women entrepreneurs have limited access to relevant networks and mentors. First-generation entrepreneurs frequently encounter weaker industry networks and fewer social capital resources, and institutional support systems remain unevenly inclusive. Geographic concentration of high-capacity UIC ecosystems in metropolitan regions further restricts access for students and startups from smaller cities and underdeveloped regions. Collectively, these barriers restrict the depth, scalability, and inclusiveness of UIC-driven startup development, reinforcing existing institutional and regional disparities.

***Enabling Factors and Success Drivers***

Alongside constraints, the study identifies many crucial success drivers that distinguish high-performing UIC ecosystems from underperforming ones.

- Universities under the leadership of proactive Vice Chancellors and empowered executive councils consistently record/report higher success in attracting industry partners, mobilising CSR resources, and institutionalising entrepreneurship as a core academic and strategic mission. In such institutions, innovation and entrepreneurship are integrated into strategic plans.
- Another success driver is the presence of institutionalised industry governance structures. Industry advisory councils, joint steering committees, and outcome-linked MoU provide continuity and alignment that go beyond individual, personality-driven collaborations. Formalised partnership frameworks, which clearly specify roles, resource commitments, and benefit-sharing arrangements, significantly improve the sustainability and effectiveness of UIC.
- Dedicated professional ecosystem managers, including full-time incubation managers, IP experts, startup relationship officers, and industry liaison executives, play a vital role in enhancing operational efficiency, investor engagement, and stakeholder coordination. Their presence enables universities to manage complex multi-stakeholder interactions that academic staff alone may not have the time or specialisation to handle.
- A stable multi-source funding architecture emerges as a key determinant of ecosystem resilience. Institutions that successfully blend CSR grants, government seed funds, consulting revenues, alumni contributions, and angel investment enjoy greater financial sustainability and can support a larger portfolio of startups over longer periods.
- Policy alignment and regulatory flexibility are important. Institutions that proactively leverage NEP 2020 autonomy provisions, state-level startup policies, and regulatory relaxations related to incubation, IP commercialisation, and industry engagement show superior agility, innovation output, and startup generation.
- Ecosystems that deliberately extend targeted support to women entrepreneurs, socially diverse founders, and rural innovators through tailored mentoring, scholarship support, outreach to non-metro campuses, and diversity-sensitive incubation practices - achieve both greater social legitimacy and a broader innovation base.

Collectively, these enabling factors show that UIC functions as a true catalyst only when embedded within coherent governance frameworks, supported by professional management, anchored in diversified and sustainable funding, and consciously designed to promote inclusion.

**Suggestions and Recommendations**

This section translates the ecosystem analysis of the study into a coherent set of actionable recommendations for universities, industry partners, and policymakers. The recommendations are structured across institutional, curricular, research, incubation, industry partnership, governance, and equity dimensions to ensure systemic strengthening of UIC as a national startup development strategy.

***Recommendations for Universities***

HEIs must fundamentally reposition entrepreneurship and industry engagement as core institutional mandates rather than peripheral activities. Universities should formalise entrepreneurship and innovation as institutional

missions through revised vision and mission statements, integrated strategic plans, and the creation of dedicated organisational units for UIC. Establishing professionally staffed UIC Cells for partnership management, IP facilitation, and startup coordination is necessary for ensuring continuity beyond personality-driven initiatives.

Institutions should allocate adequate financial resources for entrepreneurship infrastructure by budgeting a requisite proportion of institutional revenues toward incubation, mentoring programs, and student startup support. The development of endowments, alumni funding pipelines, and revenue-generating consultancy and commercialisation models can improve financial sustainability. Universities must also adopt comprehensive UIC strategies that align education, research, infrastructure, financing, and ecosystem linkages simultaneously rather than implementing isolated mechanisms.

Leadership plays a decisive role in ecosystem success. Universities should appoint dedicated entrepreneurship and innovation leaders, such as Chief Innovation Officers, reporting directly to top management with authority across academic and administrative domains. Furthermore, universities must introduce formal incentive systems for faculty participation in patents, industry projects, startup mentoring, and venture creation through career advancement recognition and performance-linked rewards (Subrahmanya & Krishna, 2021). Finally, greater operational and financial autonomy should be granted to incubation centres within transparent accountability frameworks to improve responsiveness and agility.

***Recommendations for Academic Curricula and Pedagogy***

Curricular reform is crucial to aligning education with entrepreneurial competence development. Entrepreneurship education must be mainstreamed across all disciplines, including health sciences, social sciences, education, and agriculture, rather than being confined to engineering and management programs. Core entrepreneurship courses should be complemented by interdisciplinary problem-solving modules, discipline-specific case studies, and structured venture creation pathways.

Universities must transition from passive lecture-based entrepreneurship instruction toward experiential learning models, including real-client projects, business simulations, pitch competitions, design thinking labs, structured failure-based learning environments, and startup immersion semesters that normalise experimentation and iterative learning. Industry participation in curriculum design should be institutionalised through formal advisory mechanisms to ensure continuous alignment with emerging market demands and ecosystem realities.

Faculty development is a major enabler of pedagogical transformation. Universities should design systematic professional development programs to train faculty members for entrepreneurship teaching, startup mentoring, innovation assessment, and industry collaboration. Training must cover entrepreneurial pedagogy, business model development, commercialisation processes, and innovation methodologies (Urbano & Guerrero, 2013). Such curricular and pedagogical transformation will shift universities from degree-centric to venture-competence-centric education institutions.

***Recommendations for Research and Technology Transfer***

To strengthen knowledge commercialisation, universities must prioritise the professionalisation of technology transfer systems. All research-intensive universities should establish or strengthen professionally managed Technology Transfer Offices with integrated technical, legal, and business development expertise. Clear, transparent, and time-bound procedures must be instituted for IP evaluation, licensing, and spin-off approvals to reduce procedural delays that currently deter academic entrepreneurship.

Universities should formalise IP ownership and benefit-sharing policies among institutions, researchers, and industry partners in a manner that balances institutional interests with faculty incentives for commercialisation. Mission-oriented joint research programs with industry should be systematically promoted in high-priority sectors such as AI, biotechnology, clean energy, AgriTech, and FinTech.

Dedicated proof-of-concept and translational research funding must be institutionalised to bridge the gap between academic discovery and commercial viability. Revenue-sharing frameworks for faculty-led commercialisation should be implemented to

sustain long-term engagement in innovation and startup creation.

The above measures will help bridge the persistent gap between academic research and market deployment.

***Recommendations for Incubation and Startup Support***

University incubation systems must evolve from space-providing units into full-spectrum venture development platforms. Universities should adopt comprehensive, multi-stage incubation models comprising ideation and feasibility assessment, pre-incubation skill development and network building, incubation-stage operational and mentoring support, and structured post-incubation acceleration and investment linkage.

Infrastructure adequacy must be ensured through the provision of physically and digitally enabled incubation spaces, shared technical facilities, and virtual incubation platforms for distributed teams. Universities should establish structured mentorship ecosystems connecting founders with experienced entrepreneurs, subject experts, and industry practitioners, supported by mentor training and performance expectations.

A crucial priority should be on the financial sustainability of incubators. Multi-year, assured funding should be secured through blended finance models combining government grants, CSR resources, alumni contributions, revenue shares, and institutional seed funds. National performance benchmarks for university incubators should be introduced and linked to startup survival, employment generation, and innovation outputs. Regional consortium-based incubators should be promoted to support smaller universities and rural institutions.

***Recommendations for Industry Partnership Development***

Industry engagement must evolve from transactional interactions to strategic, long-term, and outcome-oriented partnerships. Universities should institutionalise long-term framework MoUs instead of short-term project contracts and establish joint advisory boards and steering committees with clearly defined performance indicators.

Dedicated relationship management positions should be created to facilitate structured interaction between universities and companies. Universities must articulate clear mutual value propositions highlighting talent pipelines, research access, and problem-solving capacity. Targeted outreach and simplified collaboration models should be designed for SMEs to broaden industry participation.

Industrial participation in procurement from university startups, especially in public sector undertakings and large enterprises, should be actively encouraged. CSR funding must be strategically aligned with university incubation platforms and deep-technology innovation initiatives. Such structured engagement will significantly enhance market credibility and commercialisation velocity for university startups (Perkmann, et al., 2021; Ankrah, et al., 2015).

***Recommendations for Policy and Governance***

From the perspective of governance, the study recommends the creation of a Unified National UIC and University Startup Performance Framework, integrating universities, industry, MSMEs, and innovation agencies. This would enable coordinated planning, standardised benchmarking, and outcome-based monitoring of UIC performance across institutions.

Regulatory approvals for university spin-offs, particularly in biotechnology, medical technology, and clean energy, must be streamlined to reduce time-to-market delays. Greater devolution of financial and administrative powers to universities under the autonomy provisions of NEP 2020 is recommended for improving institutional agility and responsiveness.

Outcome-linked funding models for incubators and innovation programs should gradually replace purely input-based grants to incentivise performance and sustainability (NITI Aayog, 2021). Government agencies must provide stronger implementation guidance, resource supplements, and monitoring mechanisms to ensure consistent application of NEP entrepreneurship provisions across universities. Furthermore, state-level coordination mechanisms linking universities, industry, government, and civil society should be institutionalised for regional ecosystem development.

***Recommendations for Addressing Equity and Inclusion***

Inclusive UIC-driven startup development calls for deliberate institutional and policy design.

Universities and funding agencies must create dedicated support funds for women-led, rural, first-generation, and socially marginalized entrepreneur startups. Targeted mentorship, IP facilitation, investor access programs, and social capital development initiatives should be systematically implemented for underrepresented sections of society.

Geographic access to entrepreneurship ecosystems must be expanded through outreach incubation satellites in semi-urban and rural campuses, digital mentoring platforms, and structured partnerships between metropolitan and regional universities. Dedicated programs for fostering female entrepreneurship, such as women-specific mentorship networks, female investor linkages, and gender-sensitive incubation environments, must be strengthened.

Additionally, universities should explicitly recognise and promote social and sustainable enterprises alongside commercial startups, allocating resources and mentoring support for ventures addressing environmental and social challenges. Gender and social diversity indicators must be institutionalised as core metrics in incubation performance assessment. Therefore, equity must be treated not as a welfare add-on, but as a central indicator of national developmental impact, ecosystem maturity, and innovation legitimacy.

## Conclusion

This study has examined UIC as a strategic catalyst for startup development in India, positioning it within the evolving policy architecture of higher education, innovation, and entrepreneurship. Drawing upon research studies, national policy frameworks, and ecosystem-based analysis, the study demonstrates that UIC, when institutionally embedded, professionally managed, and policy-aligned, significantly increases startup formation, entrepreneurial capability development, technology commercialisation, market access, and venture sustainability. Universities are no longer peripheral actors in India's startup ecosystem; they are increasingly emerging as core nodal institutions for knowledge-based entrepreneurship and innovation-led growth.

The analysis establishes that the catalytic power of UIC operates through an integrated ecosystem of interdependent pillars, comprising research and innovation, entrepreneurship education, mentorship networks, incubation infrastructure, financing linkages, and governance enablement. When these pillars are jointly activated, universities function as high-impact entrepreneurial platforms rather than mere talent suppliers. Conversely, where institutional fragmentation, funding discontinuities, weak industry depth, or governance rigidity prevail, the startup pipeline remains shallow, uneven, and vulnerable to early failure. The study confirms that integrated UIC frameworks consistently generate superior startup outcomes compared to isolated, project-based interventions.

Concurrently, the findings reveal that India's UIC ecosystem continues to display significant structural asymmetries. Despite notable progress under Startup India, the AIM, and the NEP 2020, disparities persist between elite and non-elite institutions, urban and rural campuses, and technology-intensive and socially oriented entrepreneurial domains. These asymmetries are further compounded by faculty incentive misalignment, weak technology transfer capacity, fragmented policy ownership, and uneven access to early-stage finance. Notably, the study underscores that equity and inclusion remain under-integrated into mainstream UIC and incubation strategies, thereby constraining the social breadth and regional balance of India's university-led entrepreneurial transformation.

By proposing an India-specific integrated ecosystem framework, this study bridges a key gap in the existing literature that is otherwise dominated by Western-centric entrepreneurial university and Triple Helix models. The framework advances UIC from a project-based activity to a systemic institutional mission, anchored in long-term governance continuity, professional ecosystem management, and outcome-linked accountability across finance, incubation, research, education, and industry engagement.

From a policy and leadership perspective, the findings carry important strategic implications. For university leadership, UIC must be repositioned as a central pillar of institutional excellence, not an auxiliary engagement activity. For regulators and funding agencies, the priority must shift from input-based support toward outcome-driven, performance-linked ecosystem financing

and coordinated national benchmarking. For industry leaders, sustained engagement with universities must move beyond talent acquisition toward co-creation of innovation and shared entrepreneurial value. Government agencies must strengthen implementation guidance, inter-agency coordination, and long-term funding commitments to ensure consistency across institutions and regions.

In conclusion, India stands at a decisive inflexion point in the evolution of its university-driven startup ecosystem. As the country aspires to consolidate its position as a global startup hub alongside its growing technological capabilities, UIC will remain key to this transformation. When supported by coherent governance, deep industry integration, professional incubation systems, and inclusive institutional design, UIC has the capacity to transform universities into powerful engines of innovation, employment generation, and regionally balanced economic growth. Realising this potential is not merely an institutional challenge; it is a national developmental imperative in India's journey toward a knowledge-based, innovation-led, and socially inclusive economy.

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# India Desperately Needs Deep Tech Startups to Achieve Developed Nation Status by 2047

**B M Naik***

The paper presents the brief need and importance of deep tech start-ups in a rapidly advancing world, especially in the context of India, aiming to achieve developed nation status by the year 2047. The initiatives taken by the Government are outlined in brief. Deep tech startups essentially require universities to become entrepreneurial, innovative, and to generate advanced breakthrough and disruptive technology so essential for spinning off deep tech enterprises. The changing role of universities and their becoming entrepreneurial in the new world is also presented. Action to be taken by those who matter most, like academic and political leaders in Government and in universities, for shaping them is presented.

The paper also describes the characteristics of entrepreneurial universities, which give birth to deep tech startups. Universities to become entrepreneurial demands a change in the mindset of Indian academic and political leaders. They ought to realise vast new opportunities in the new world and harvest them through deep tech startups. The paper presents new visions & missions derived from world ranking entrepreneurial universities, that need to be adopted and implemented in Indian universities. Organisation structures like advanced research labs, Research Parks, Technology incubation centres, patent & IPR centres, would have to be installed forthwith in university campuses. Curriculum in universities would have to be oriented to creativity, discovery, and commercial exploitation of deep technology. Lastly, the paper also brings out problems in the adoption and implementation of deep tech startups in the present Indian conditions.

Success depends on whether the universities will dream big and adopt global visions & missions to become entrepreneurial**? S**hall India be able to make its universities entrepreneurial in global comparison?

In the knowledge-based economy of today, a nation to be classified as a developed nation has essentially to be using and generating new knowledge and cutting-edge technology. India to become a developed nation and leader in technology must engage in high-end research in emerging technology for solving people's problems, impacting the human society world over.

## What are Deep Tech Startups?

Deep tech startups are companies that develop products & processes based on significant cutting-edge scientific discoveries and engineering innovations. These startups are often based on substantial long-term research and development, pushing the boundaries of existing technologies to take on complex challenges. They are typically characterised by long development timelines, high capital requirements, and a focus on solving significant human problems. They are often carrying a high level of risk, with gains that are far higher. They focus on technologies like AI, Quantum computing, biotech, and advanced materials, semiconductors, defence, quantum tech, Artificial Intelligence, biotechnology and more, with the potential to address major global challenges disrupting existing industries.

The National Deep Tech Start-up Policy captures various new policy instruments and suggests necessary policy changes under the following themes:

- Nurturing Research, Development, and Innovation.
- Strengthening the IPR Regime.
- Facilitating Access to Funding.
- Enabling Shared Infrastructure and Resource Sharing.
- Creating Conducing Regulations, Standards, and Certifications.
- Attracting Human Resources and Initiating Capacity Building.
- Promoting Procurement and Adoption.
- Ensuring Policy and Program Interlinkages.
- Sustaining Deep Tech Startups.

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Presently, startups in India are based on shallow research, known knowledge & known technology. They take birth fast and exit fast. They do not make a deep worldwide impact on men and women, and become global players. India is dreaming of becoming a developed country by the year 2047 and a world technology leader, which is appreciable. But this essentially requires deep tech startups. Does India have them? By and large, the present universities are teaching-oriented. They are not research-oriented. Unless the universities are research & innovation and engineering-focused focussed, the deep tech startups are less likely to spin off deep tech startups. In the absence of advanced research and deep tech startups exodus of talented students to universities abroad will continue, benefiting other countries like the USA.

**Initiatives taken by India government**

The Startup India initiative was launched by the Government of India to foster entrepreneurship and promote innovation by creating an ecosystem that is conducive to the growth of startups. It was announced by Hon'ble Prime Minister Shri Narendra Modi on 15th August 2015. Institutes like IIT Chennai, IISC Bangalore, IIT Bombay, and IISRO have launched more than 10298 Desi deep tech startups. The number is too small to become a developed nation, and it will take much more effort and hand-holding to grow. The state and central universities, which are more than 1000 which are teaching-focused have not yet given birth to deep tech startups. This is a serious shortcoming. They will have to depart from teaching to research and an enterprising base to promote deep tech startups. The three pillars of startup policy are :

1. Simplification and Handholding Facilitate Setting up and Operation,
2. Funding Support, and Incentives, and
3. Industry-Academia Partnership and Incubation.

This multi-stakeholder program, a collaboration between Startup Policy Forum, Startup India, Startup Hub, and IIT Madras, aims to strengthen policy dialogue and bolster the deep tech eco-system. The government has provided 100 crore funds in 2025 for the purpose. The national deep tech start-up policy strives to drive innovation, economic growth, and societal development through the utilisation of advanced research-based tech inventions. The government provides funds and, in addition, mobilises funds from the private sector. There are two main requirements for deep tech startups: the first is technical research manpower, and the second is the infrastructure, like labs, equipment for research, requiring money.

**Changing Role of Universities**

Demand for higher education in the decades ahead will grow exponentially. Advanced education will become even more pressing both for individuals and society. Education will change in profound ways; much of the change will be driven by global market forces. We must develop capacity in institutions to change. This is a big challenge for the nation. Universities must remove constraints. We cannot afford to waste talent.

"Think globally, Act locally," is the first and foremost new role and responsibility of entrepreneurial universities in the present stormy weather of global changes. They should not think routine way like in bygone days. Globalisation offers new opportunities and is a strong driver of change. Institutes must perform differently. What is the new role that institutes must play? They must look beyond instruction in classrooms, become enterprising to generate new knowledge, new technology, patents & IPR to make a knowledge society effective. Institutes should volunteer to show leadership in this noble cause.

Another new role is to Dream Big Jump, jump-start technology clusters attached to institutes using youthful talent for research and innovation. They are found to act as major contributors to regional development. Incubators, technology parks, and IPR act as spark plugs for development. Institutes now should have to produce not only graduates but also entrepreneurs generating and using New Technology.

Thirdly, Entrepreneurial universities in global circumstances must aim at "corporate development." They must produce captains of world-class industry. Building synergy between the education and business sectors for national growth is essential. New technology is driving business to greater heights, requiring more skilled and flexible graduates. Universities and corporate presidents should establish a new forum of partnership to achieve synergy.

The fourth role is to take a special drive for generating advanced state-of-the-art technology. It is becoming ever more pressing both for individuals

and society. Much of the change in higher education is being driven by research in technology and market forces. Institutes must take a new look at it, and on a mass scale, start research-based M Tech and doctoral courses.

Fifthly, the Indian Industry can no longer do all the research; it needs to survive by itself. Universities in partnership with industry may have to conduct research more vigorously. Leaders in education and leaders in industry must walk hand in hand to create deep tech startups.

Last but not least, Traditional regulations by universities and government in today's stormy weather of globalisation do not suffice. Higher and Technical education must remove constraints and introduce flexibility and autonomy. Virtual and for-profit universities from across the world are on the horizon and posing a serious threat to Indian universities.

If universities do not become entrepreneurial in the light of the above, opportunities will slip out of our hands, and economic stagnation may result. "If you charge education with the spirit of innovation, creativity, discovery, then you do not have to do anything else, but if you do not do this and do everything else, that is not going to matter much.

## Characteristics of Universities Abroad

On the campuses of universities like Madison, Cambridge, MIT, and Stanford, what we notice is that research companies are flocking around them. Incubators, research parks, innovation centres, and patent and IPR bureaus are distinctly visible. Venture capital companies have opened offices on campuses in search of new technological ideas for commercialisation. Universities in developed countries have become like magnets, attracting not only scholars but also industry, entrepreneurs, and venture capital firms from across the world. They are globalising their operations to meet the world's needs in both education and technology. By virtue of their strong research base, these entrepreneurial universities are sources of the latest knowledge, education, and new ideas that enable companies to succeed in the global market. Universities in the USA produce as many as 200 patents per year. These universities sell patents to companies, earning an income that accounts for almost 30 per cent of their budget. Young scholars and mid-career professionals carry out research and innovation, which is disseminated through classroom teaching. Every professor is a research scientist in addition to being a teacher. Innovation and research are considered the 'well-springs' of economies.

National Innovation System (NIS) may have to be considered in terms of NEP–2020. Education is now required to lay emphasis on teaching research skills, innovation skills, and entrepreneurship skills, for which lessons from best global practices are useful. Preparing the mindset of authorities and professors is a vital factor for success in the implementation of reforms.

## Mindset of Higher & Technical Education Key Persons

*Changing the mindset of higher & technical education key persons in terms of the modern world will undoubtedly bring a bright future for youths***.** Changing the 'Mind Set' of key people in College/ University for Global Competitiveness is the Central Message. Today's globalised world is full of opportunities, truly unlimited. India wants to make the most of them. Higher & technical education occupies a high priority in Indian families and the government. Youths are coming to universities & colleges in increasing numbers. They want a better education. If the universities & colleges make use of the best global practices given in the article, the day is not far, when the institutions will flourish, fulfil the rising aspirations of people, and rise to greater heights to become a hub of education producing deep tech startups. Much of Indian & global humanity's problem-solving potential resides within universities. The following are the best global practices derived from world ranking universities, which need to be urgently adopted in Indian universities & colleges. Best Global Practice of the Triple Helix Model Needed. The government would have to adopt the 'Triple Helix organisation model' in universities & colleges to make them globally competent. This model can be useful for the more effective implementation of NEP-2020. Having NEP-2020 is good, but not enough. The government ought to adopt the Triple Helix model for more effective implementation. Developed countries like the USA, European countries, East Asian countries like Japan, Korea, Hong Kong, Singapore, and China are adopting this model. By virtue of Triple Helix, the quality and quantity of

research in universities have improved, patenting & IPR have gone up, the number of deep tech start-ups has shot up, Commercial exploitation of research output has increased, Collaborative research between academia and industry has increased, Quality of education in universities has gone up. The model strengthens the National Innovation System [NIS]. It proposes that the knowledge infrastructure of the National of a Triple Helix consists of, 1. University- 2. Industry- 3. Government. Present isolation and independent working of the three Helices be goodbye. Governments of various countries in the world are adopting knowledge-based growth as a key driver of economic development. Developing economies like India are starting to adopt knowledge-based, startup-based growth. Universities are tending to become not only for teaching but also for research and innovation. Only those nations win in the world that use and generate new knowledge, and new technology is needed in society in various walks of life. As new knowledge and cutting-edge technology become an increasingly critical national resource of economic development, traditional knowledge-generating organisations such as universities have gained more importance. So, more entrepreneurial universities and colleges in developing countries are being set up. They are set up not only for teaching but also for research & innovation and deep tech startups. The government of India is giving more grants for research projects. Governments expect research results to be commercially applied in industry to increase the quality and quantity of products and reduce their cost. The National Research Foundation was established by the government of India, and it has earmarked a good amount of money for research and in Research Parks. World experience tells us that institutions/regions/ cities develop faster when they have established Research Parks in universities and colleges.

Research Park brings long-range thinking, long-range planning and advanced deep tech research so badly needed in the Indian industry. University and industry to remain globally competitive ought to carry out jointly the functions of research & innovation to keep them fit for the future. Today, success in the global marketplace means creating and applying new knowledge, which is to say new deep tech startups, faster than one's competitors. World winners will be those who develop talent, technologies, techniques, and tools so advanced that there is no competition. Innovation potential of youths in the absence of a Research Park today is wasted. It enables it to be unfolded and put to fuller use. How to produce more entrepreneurs and how to encourage more deep tech startups to grow are the main visions and missions of entrepreneurial universities.

A university to create and maintain its leadership position needs to establish the Research Park.

The park works as a magnet to attract the best and brightest talent from anywhere and everywhere in the world.

One of the essential ingredients to generate hi-tech jobs, well-paying jobs, industrial cluster is the creation of a Research Park.

Research Park, if established, will make a big difference for the industry, economy, and university. Without a Research Park the university, industry, and institutes, as well as cities and regions, however hard people may work, will remain behind in international competition. A university with a park will turn out leaders in industry and leaders in technology with knowledge qualitative nature by international standards. It will create technology pioneers. The quality and relevance of education would become fit for the future. Why will students then migrate elsewhere? The University without park will remain incomplete, ineffective, and outdated in a modern sense, and unfit to produce deep tech startups. When shall we realise this? The Region can win in global competition by establishing a Research Park, and not without it. "Success in international competition depends now on turning intellectual strength into marketable commodities"

Let us dream big, think great to make the university in the long term a world class institute.

Every Engineering Institution may like to install a Research Park, patent centre, innovation centre, in campus in partnership with the alumni association, to make education Globally Competitive

IIT Chennai and many others have already done, Anil Kakodkar committee has recommended to the Maharashtra Government,

## Conclusion

*Research-based Deep tech startups can undoubtedly bring vast opportunities and build*

*capacities in people to make India a developed country by the year 2047.*

Deep tech startups in India, however, will grow only if universities become entrepreneurial and produce research output competitive by world standards. Only IITs will not suffice. Indian universities may have to catch the winds of change in the world. The mindset of the key people in government and in the university must be in its favour on a sustained basis. Technical manpower in India is available in abundance. It, however, needs to be groomed in the areas of deep technology to world standards. There are challenges and problems in the adoption of deep technology, but they are not insurmountable. There are more risks, but there are far more gains.

The vector direction of present universities, state and central, which are more than one thousand, must be drastically changed to an advanced research base. This is the main problem in the adoption of deep tech startups. Making universities entrepreneurial and research-based will cost the nation in terms of time, money, and effort. This requires a strong, sustained mindset in favour of deep tech research output. The speed and direction of deep tech startups depend on consistency in our efforts on long timelines. The challenge before India is how fast, qualitative, and competitive a culture by world standards in favour of research, innovation, creativity, and entrepreneurship can be created?

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## ATTENTION READERS

The government is commemorating the 150th birth anniversary of Sardar Vallabhbhai Patel with a two-year-long nationwide programme from 2024 to 2026 to honour his monumental contribution to the country. University News also invites articles on the 'Contributions of Sardar Vallabhbhai Patel to the Nation' . Authors can submit manuscripts throughout the year till September 30, 2026 to Dr Sistla Rama Devi Pani, Editor, University News, via Email: ramapani.universitynews@gmail.com, and also send a copy to: universitynews@aiu.ac.in.

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Editor

# The Academic Research-Industry Nexus Framework: A Video-Mediated Digital Architecture for Strengthening University-Industry Collaboration in India

**Manoj Praveen G***

Universities and industry are increasingly intertwined as engines of innovation, skills development, and regional competitiveness. Researches highlight that well-designed linkages accelerate technology transfer, commercialisation, and graduate employability, but they are complex to build and sustain. Nsanzumuhire and Groot (2020) suggest that University–Industry Collaboration (UIC) primarily operates through three interrelated forms: educational collaboration involving industry participation in curriculum design, internships, training and joint supervision; research collaboration through joint R&D projects and scholarly publications; and academic entrepreneurship manifested in patents, licensing, spin-offs and start-up ventures. They further argue that University–Industry Collaboration faces several major barriers. These include misalignment barriers arising from differences in goals, timelines and expectations between universities and industries; motivation-related barriers such as lack of incentives and rewards; capability-related barriers due to inadequate skills and infrastructure; governance barriers caused by weak policies and poor coordination mechanisms; and contextual barriers linked to economic, cultural and policy constraints that shape the collaboration environment.

University–industry collaborations are important for generating knowledge and research funds, but they are difficult to manage. especially in protecting intellectual property and capturing value from inventions (O'Dwyer, et. al., 2022). When scientists are more motivated, research partnerships work better, and universities are more successful in owning, protecting, and commercialising academic patents. According to a systematic bibliometric analysis of the Web of Science core collection, the scholarly output and citation rates regarding university spin-offs (USOs) have experienced exponential growth over the last decade (2014–2023), maintaining a robust upward trajectory despite the global disruptions caused by the COVID-19 pandemic (Sánchez, et al., 2024).

The Government of India (GOI) has formally repositioned the national innovation system towards socially accountable knowledge production by embedding university–industry technology transfer within its higher education, intellectual property and research funding frameworks. The National IPR Policy (2016) and National Education Policy (2020) explicitly mandate the commercialisation and translation of publicly funded university research for public benefit rather than for market profitability alone. This policy orientation aligns with the Mode 2 knowledge production paradigm and the Triple Helix model, which conceptualise innovation as a socially situated, problem-driven and inter-institutionally co-produced activity (Etzkowitz & Leydesdorff, 2000). This orientation is operationalised through dedicated institutional mechanisms including Technology Transfer Offices, Technology Innovation Hubs under NM-ICPS(National Mission on Interdisciplinary Cyber-Physical Systems), and the I-STEM (Indian Science, Technology and Engineering facilities Map) portal, which structurally integrate industry linkages into academic research ecosystems. The successful transfer of indigenous vaccines, diagnostics and agri-technologies to industry further evidences that GOI's innovation architecture is intentionally designed to facilitate the societal deployment of university research.

The India Science, Technology & Innovation (ISTI) Portal and India Science Channel serve as a centralised digital gateway that facilitates university–industry linkage by hosting comprehensive repositories of academia-industry partnerships, ongoing research, and developed technologies, while utilising its 24x7 video platform to showcase collaborative innovations and technology transfer success stories. The specific initiative on the ISTI Portal for university–industry linkage is the "Academia Industry Partnerships"

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section, which acts as a centralised repository and gateway for collaborative schemes. Within this framework, a prominent program is SAHAJ (Scientific Infrastructure Access for Harnessing Academia University Research Joint Collaboration), which provides industry, startups, and entrepreneurs with access to the high-end equipment and scientific infrastructure of academic institutions.

Despite the existence of multiple national policy initiatives, institutional mechanisms and funding architectures designed to promote university–industry technology transfer, a persistent structural connect would be a dependable and reliable R&D support for the Indian innovation ecosystem. University research remains largely dissemination-oriented, while industry demand articulation remains fragmented, informal and episodic. A nationally standardised digital mediation layer that continuously aligns university research outputs with evolving industry problem spaces could become a strong backbone for the research-industry nexus. Addressing this gap through a dedicated digital intervention holds substantial promise for enhancing the societal relevance, responsiveness and translational efficiency of university research.

## Design of an Innovative Framework

This paper proposes a policy-oriented conceptual framework aimed at strengthening India's university–industry technology transfer ecosystem by introducing a permanent digital mediation layer. While existing national innovation policies emphasise collaboration between universities and industry, the operational interface between academic knowledge production and industrial demand articulation remains largely episodic, informal and institution-specific. The present framework conceptualises innovation as a systemic, continuous and digitally mediated dialogue process rather than a linear transfer of research outputs. It builds upon two earlier works: the first one, a two-way matching model (Zhao and Shi, 2025), connecting university R&D outputs (supply) and industry technology needs (demand) and a second, the Model of a Triple Helix of University Industry Government Relations (Etzkowitz & Leydesdorff, 2000).

Zhao and Shi (2025) suggested a strategic framework for university–industry collaboration designed to bridge the gap between academic research and industrial needs. It centres on a two-way matching platform that uses data-driven algorithms and expert reviews to pair university innovations with specific company needs. Zhao et al. conceptualise a bidirectional matching platform to reduce supply–demand mismatch at a regional collaboration level. In this work, the present framework generalises and elevates this into a national-scale institutional architecture, transforming platform logic into a new helix of innovation governance.

Whereas the Triple Helix III model conceptualises innovation as emerging from overlapping interactions among universities, industry and government (Etzkowitz & Leydesdorff, 2000), the present framework extends this model by introducing a permanent digital mediation layer to enable continuous synchronisation between academic research and industry demand.

This framework advances Triple Helix III by introducing an AI-enabled digital mediation infrastructure as a fourth systemic helix that operationalises Leydesdorff's reflexive overlay of communications into a permanent, scalable and self-learning national innovation coordination layer. While Triple Helix III theorises the emergence of hybrid institutional networks, the proposed framework provides the missing digital institutional architecture required to operationalise a knowledge-based economy at the national scale.

## The Academic Research- Industry Nexus Framework

This paper proposes the Academic Research-Industry Nexus (ARIN) Framework, a policy-oriented digital governance architecture designed to institutionalise continuous synchronisation between university research ecosystems and industry demand systems. Figure 1 provides diagrammatic depiction of the Framework.

To operationalise continuous and meaningful dialogue between universities and industry, the present framework proposes a national-level digital mediation architecture designed to systematically align academic knowledge production with evolving industrial demand. It is structured around a unified knowledge environment that organises university research outputs in machine-interpretable form, formalises industry problem articulation into standardised video representations, and employs intelligent mediation mechanisms to dynamically synchronise both domains. Through

this architecture, academic research capabilities and industrial needs are continuously indexed, interpreted and aligned, thereby creating a self-learning innovation ecosystem capable of supporting socially relevant and translational deployment of university research.

The digital repository primarily relies on standard twenty-minute video formalised for the adaptation of research outputs into an industry scenario. These videos are presented by the researchers themselves and supported by additional diagrams, or photographs or clips of animations to ensure semantic clarity.

## Components of the Framework

The proposed framework consists of three integrated digital subsystems, namely University Research Results Repository (URRR); Industry Needs Classification System (INCS); AI-Facilitated Matching Platform (AIFMP).

### *University Research Results Repository (URRR)*

This subsystem represents a national, discipline-wise indexed digital repository that houses structured representations of university research outputs, in the form of twenty-minute videos narrated by the researcher highlighting the industrial application possibilities. These videos will be further meta-tagged with associated publications, patents, prototypes, datasets, software tools and related literature. Further, each research output will be semantically tagged with metadata such as application domains, technology readiness levels and social relevance indicators, enabling machine interpretability and translational usability.

### *Industry Needs Classification System (INCS)*

This subsystem provides a standardised digital environment for the articulation and classification of industry problem statements and technological requirements. Industry needs are organised sector-wise and technology-wise and are tagged with deployment context, urgency, scalability and expected social impact. This system formalises industrial demand articulation into a machine-readable format, thereby enabling systematic matching.

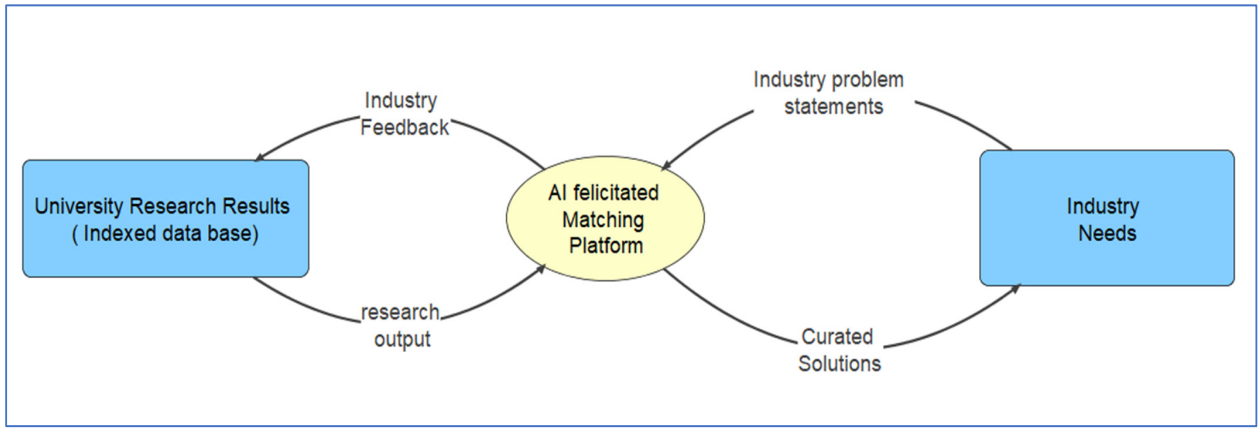
### *AI-Facilitated Matching Platform (AIFMP)*

Functioning as the core mediation layer, the AI platform continuously processes inputs from both subsystems to perform semantic similarity analysis, readiness mapping and relevance scoring. It curates potential solution portfolios, facilitates structured dialogues between universities and industries, and supports feedback integration from industry deployment experiences back into the university repository.

## URRR - A Digital Repository

The University Research Results Repository should be an indexed digital repository of videos made by researchers, doctoral fellows and academic scholars that would disseminate their research findings and assert the relevance of their research to industry linkage possibilities. Those researchers who wish to connect with industry or who want to disseminate their research findings to the public would be invited to give a 20-minute presentation to assert the seed value of their research to the stakeholders. The presentations will be video-

**Fig 1: Theoretical Framework for Academic Research-Industry Nexus**

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graphed in a standardised format in the studio at various EMMRCs associated with reputed universities designated as nodal centres across the nation. The IQAC and the IIC (Institution's Innovation Council) of the University should collaborate to bring together the academia and the infrastructure to develop and vet the videos at the regional level. Each video will have 4 sections: i) An introductory part that tells the outline of the methodology of research, ii) An explanation part of the major findings and the seed value of the finding, iii) The claim of the possibilities of Industry-connect, and Entrepreneurship possibilities and iv) an epilogue that hints upon the necessary mandates for connecting with the researcher. This shall be accompanied by written summaries, structured abstracts, infographics, datasets with metadata associated with each video.

All the videos will be edited for a uniform and coherent presentation style of presentation. The finished videos will be hosted on a server and will be catalogued on the basis of pertinent parameters like subject, potential client base and 'ready to use' levels. Every video will be accompanied by a standardised metadata sheet (discipline, keywords, Technology Readiness Level, sector, social impact) and an auto-generated transcript, enabling accurate semantic search and AI-based matching.

This deliberate emphasis on video leverages its unique capacity to convey personal credibility, enthusiasm, and tacit knowledge—nuances of tone, confidence, and contextual insight that are often lost in text-based formats and that play a critical role in building the interpersonal trust essential for sustained university–industry collaboration. Moreover, video enables dynamic demonstration of prototypes, simulations, laboratory processes, or field trials, allowing researchers to visually illustrate functionality, scalability challenges, and real-world performance in ways that static descriptions or images cannot adequately capture. Such rich, first-hand presentations directly address persistent information asymmetries by providing industry stakeholders with an accessible, engaging, and substantively informative overview of research potential. While supplementary textual and visual materials enhance discoverability, searchability, and AI-driven matching, the video format remains central to transforming academic knowledge from dissemination-oriented outputs into compelling, industry-relevant propositions that facilitate meaningful dialogue and translational partnerships.

The aspirant scholars would apply for the opportunity for video dissemination through a national portal at the MoE's Innovation Cell (MIC) with a synopsis of their work. An expert panel at a regional level designated at the nodal centres would examine the worth of the work in the context of industrial linkage and would call for an interview and training on presenting the work in an effective mode that would engage the potential stakeholders. The aspirant scholars could be charged with a nominal fee for recording their presentation in the studio of EMMRC associated with the nodal centre.

## INCS-A Template for Defining Industry Demands

INCS addresses how industries communicate unmet technological challenges, embedding semantic keywords and disciplinary tagging, and incorporating readiness and impact indicators within each problem statement. Through these design features, industrial requirements are transformed from tacit, organisation-specific concerns into clearly defined, searchable and prioritizable digital demand signals, thereby enabling systematic matchmaking, interdisciplinary solution discovery and translational research alignment within the proposed digitally mediated research–industry nexus.

### *Clear Problem Posting Format*

Industries will be given a simple online form to clearly explain their problem—what exactly is not working, what improvement they are expecting, how urgent it is, and by when they need a solution. This helps convert real industrial difficulties into clearly written problem statements that universities can understand and respond to.

### *Keyword and Discipline Tagging*

Each industry problem will be tagged with keywords and suggested academic disciplines (such as physics, chemistry, computer science, education, management, etc.), so that the system can automatically identify which university departments and researchers may be able to help solve it.

### *Readiness and Impact Information*

Industries will also indicate whether they are looking for a ready-to-use solution, a prototype,

or an early-stage research idea, and will briefly state how the solution could benefit society or the market. This helps researchers understand how practical the problem is and what kind of solution is expected.

## AIFMP – AI-facilitated Matching Platform

To move beyond static repositories and episodic collaboration mechanisms, the framework incorporates an AI-Facilitated Matching Platform (AIFMP) as its central digital mediation and governance layer. While URRR and INCS structurally formalise research supply and industry demand, respectively, AIFMP operationalises their continuous synchronisation through intelligent coordination, learning and policy alignment functions. Rather than serving merely as a technical matching tool, the platform is conceptualised as an institutional brain that orchestrates collaboration processes, interprets readiness gaps, captures feedback, and aligns research–industry engagements with national development priorities. Through these integrated meta-functions, AIFMP transforms university–industry interaction into a self-learning, socially responsive and policy-steerable innovation governance infrastructure.

### *Intelligent Semantic Matching and Readiness Mapping*

AIFMP functions as an intelligent matching engine that goes beyond basic keyword searches to identify meaningful connections between university research capabilities and industrial problems. By using semantic analysis, it can recognise interdisciplinary solution pathways that may not be immediately obvious, thereby expanding the range of possible academic contributors to a given industrial need. In addition, the platform assesses the maturity of potential solutions and maps readiness gaps, recommending translational steps such as prototype development, pilot testing and field validation. This enables industries to understand not only which research outputs are relevant, but also how close they are to real-world deployment and what support is required to bridge remaining gaps.

### *Collaboration, Orchestration and Learning Feedback*

Beyond matching, AIFMP orchestrates the entire lifecycle of university–industry collaboration. It facilitates initial dialogue, supports co-design and pilot implementation, and tracks validation and deployment outcomes. Feedback from industry adoption experiences is systematically captured and reintegrated into the platform, allowing the system to learn from both successful and unsuccessful collaborations. Over time, this creates an institutional memory that improves future matching quality, refines research directions, and transforms episodic collaborations into a continuous, self-learning innovation ecosystem.

### *Policy Alignment and Social Impact Governance*

AIFMP also serves as a governance interface that aligns research–industry collaborations with national and regional development priorities. It classifies and prioritises engagements in strategic sectors such as healthcare, agriculture, sustainability and digital technologies, thereby enabling policymakers to steer public research investments toward high-impact domains. In parallel, the platform tracks indicators of social and economic benefit, ensuring that innovation outcomes are assessed not only in terms of commercial success but also in terms of public value creation. Through this governance role, AIFMP embeds social relevance and policy responsiveness into the digitally mediated research–industry nexus.

## Conclusion

University–industry linkages constitute a central pillar of contemporary innovation systems, influencing firm competitiveness, graduate employability and regional development when supported by trust, absorptive capacity and enabling governance structures. However, effective linkage requires more than formal instruments such as technology transfer offices and contractual arrangements; it demands relational alignment, structured intermediation and digitally enabled governance models that integrate university, industry and government roles into a continuous innovation dialogue. The proposed digitally mediated research–industry nexus framework responds directly to this need by institutionalising a permanent, AI-ready coordination layer that transforms episodic collaboration into a self-learning national knowledge infrastructure.

The framework is strongly aligned with the National Education Policy (2020), particularly its emphasis on nurturing incubation centres, strengthening industry–academia linkages,

promoting interdisciplinary research across sciences, humanities and social sciences, and fostering creativity, critical thinking and translational innovation ecosystems (Para 11.12). By embedding these policy aspirations within a digitally governed, AI-mediated coordination architecture, the framework offers a nationally scalable pathway for transforming dispersed academic knowledge into socially relevant and economically impactful innovation outcomes.

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# Teacher Education for Increasing Entrepreneurship Mindset

**Jayantibhai V Patel***

The uprising in global economies driven by technological advances, digitalisation and socio-economic complexities has sensitised the need for entrepreneurship as a key lever for sustainable development and employment generation. Entrepreneurship has emerged as one of the most important competencies for the contemporary workforce. Contemporary teacher education institutions play a crucial role in equipping students not only with academic and pedagogical skills but also with an entrepreneurial mindset that promotes creativity, resilience, risk taking and problem-solving. Teacher education institutions, which historically focused on cognitive and pedagogical knowledge, are now expected to produce teachers capable of initiating ventures and designing solutions to societal problems. Traditional career paths are no longer protected and the demand for new skills is continuously evolving. In this context, entrepreneurship has gained enormous importance as a means of economic flexibility, innovation and sustainable development. Traditional education systems, which mainly focus on theoretical knowledge and examination-oriented learning are no longer adequate to meet the demands of the modern world. There is an increasing need to cultivate an entrepreneurial mindset among students to enable them to become creative thinkers, problem solvers and job creators rather than job seekers. Dr. A.P.J. Abdul Kalam, has suggested in his address on August 27, 2004, that higher education must consciously endeavour to give an entrepreneurship orientation to students to tackle the problem of educated unemployment. Teacher education plays a crucial role in shaping the mindset, attitudes and competencies of students. In this context, entrepreneurship mindset development has emerged as a critical educational objective.

Entrepreneurship education is no longer limited to business creation; it includes creativity, critical thinking, leadership, flexibility, opportunity recognition and ethical decision making. It is not restricted to business ventures but applies equally to social, educational and professional domains. Developing such a mindset among students is now considered an essential educational goal. Emphasis on entrepreneurship education is reflected in national initiatives such as Skill India, Startup India, and the National Education Policy (NEP) 2020, which advocate experiential learning, vocational exposure and innovation-oriented education. Teacher education institutions play a crucial role in this transformation as teachers serve as facilitators of entrepreneurial learning. Despite policy support, entrepreneurship education remains inadequately integrated into mainstream curricula, particularly in teacher education programs.

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## Concept of Entrepreneurship

Entrepreneur is a French word which had its first appearance in the literature in 1253. At that time, it was used in different forms. The term Entrepreneur was inspired by the French verb *entreprendre* which means *undertaker* as in the sense of someone undertake a significant project. The terms entrepreneur and entrepreneurship, like most terms or concepts in humanities, have no unanimously accepted definition. The person who initiates and takes a risk or embarks on an entrepreneurial venturing to make some gains is called an Entrepreneur. The term entrepreneurship can be abridged as an attempt to profit by taking risk and initiative. Entrepreneurship puts emphasis on attributes such as a high degree of initiative and the willingness to take a high degree of risk with the hope of gain in it. The concept of entrepreneurship right up to 1960, was more along the lines of economic theory. However, after 1960 the attention and focus expanded beyond just an economic theory. Entrepreneurship became an array of personality traits and the resultant effect of a series of developmental experiences (McClelland, 1961; Collins & Moore, 1970). Entrepreneurship has become both an individual as well a social activity.

## Concept of Entrepreneurship Mindset

The entrepreneurship mindset consists of cognitive, behavioural and emotional attributes enabling opportunity recognition, creativity, risk tolerance, flexibility and strategic decision making. It is supported by human capital theory, social cognitive theory, behavioural entrepreneurship

theory and constructivist learning theory, all of which affirm that entrepreneurial behaviour can be developed through education. According to the OECD (2018), an entrepreneurial mindset involves the ability to transform ideas into action through creativity, innovation and risk management. The entrepreneurial mindset refers to a specific way of thinking and approaching situations that enables individuals to identify opportunities, take initiative, manage risks and create value in uncertain and dynamic environments. It is not restricted to starting a business; rather, it is a set of attitudes, skills and behaviors that can be applied in all areas of life, including education, employment and social development. Some of the core characteristics of an entrepreneurial mindset include,

- Opportunity recognition, such as an ability to identify gaps, unmet needs or new possibilities in the market or society.
- Creativity and innovation, such as the capacity to generate original ideas and develop innovative solutions to problems.
- Risk-taking ability, such as willingness to take calculated risks and make decisions under uncertainty.
- Problem-solving skills, such as the ability to analyse problems critically and develop effective practical solutions.
- Self-confidence and initiative, such as belief in one's abilities and readiness to take action without waiting for instructions.
- Resilience and perseverance, such as an ability to learn from failure, adapt to change and persist despite obstacles.
- Leadership and responsibility, such as taking ownership of tasks, motivating others, and leading initiatives.

An entrepreneurial mindset is essential in today's fast-changing world since it prepares individuals to adapt to technological, economic and social changes. It encourages self-employment, innovation and lifelong learning.

## Entrepreneurship Education

Nowadays, academic entrepreneurship is rapidly rising as a leading field of study in schools, colleges and universities all over the world. Entrepreneurship that has undergone a renaissance in America is echoing around the world. Innovation and start-ups are already part of everyday life in most countries. It is a renaissance boosted by the Internet. According to Thomas Jefferson, every generation needs a new revolution, hence innovation and entrepreneurship are required in a changing society, not only in the business sector but also in the education sector. The system of teacher education has been experiencing several changes in academic dimensions. The National Curriculum Framework for Teacher Education (NCFTE 2009), provide a comprehensive view of the existing realities and perceived futuristic scenario for quality teacher education. This calls for academicians in all institutions to make entrepreneurship a normal, ongoing, everyday activity. No profession can operate in isolation. In an entrepreneurial society, academicians cannot afford to remain as only academicians but have to develop academic entrepreneurship. In view of its importance, the Department of Science and Technology (DST), Government of India, has started to evolve policies regarding entrepreneurship capabilities, attitude and the honing of a mindset and skills that are essential for entrepreneurial venturing.

Entrepreneurship education initiatives encompass a wide range of pedagogical approaches, including classroom instruction, experiential learning and mentorship and networking activities. Empirical studies have examined the effectiveness and impact of entrepreneurship education interventions across different educational levels and contexts. The literature on the role of education in fostering entrepreneurial skills and mindsets highlights the complex interplay between individual characteristics, educational experiences and socioeconomic contexts. While entrepreneurship education holds promise as a means of promoting innovation, economic development and social progress, ongoing research is desirable to address challenges related to program design, implementation and evaluation.

Theoretical Foundations of Entrepreneurship Education should be based on Constructivist Learning Theory, Experiential Learning Theory and Social Learning Theory. Constructivist theory emphasises learner-centred education, where students actively construct knowledge through experience (Piaget, 1972). Entrepreneurship education aligns with this approach by promoting inquiry, experimentation and reflection. Kolb's (1984) experiential learning model highlights learning as a cyclical process involving

experience, reflection, conceptualisation and experimentation. Entrepreneurship education greatly relies on experiential activities such as projects, simulations and internships. Bandura's (1977) social learning theory emphasises observation, imitation and modeling. Interaction with entrepreneurs, mentors and peers significantly influences entrepreneurial motivation and self-efficacy.

## Developing Entrepreneurial Mindset

Teacher Education can contribute to entrepreneurship mindset development through curriculum integration. Entrepreneurship concepts should be embedded across disciplines rather than confined to commerce or management studies. Teacher education must emphasise transferable skills such as communication, teamwork, leadership and adaptability through project-based learning, fieldwork and community engagement. Pedagogical approaches for entrepreneurship education based on effective entrepreneurship pedagogy include problem-based learning, inquiry-based learning, design thinking, case study method, simulation and role play, startup and social innovation projects. Among its manifold objectives, teacher education is increasingly acknowledged for its potential in fostering entrepreneurial skills and mindsets among future teachers. Teacher education programs must therefore focus on developing entrepreneurial competencies among teachers themselves.

While traditional education systems have historically focused on imparting knowledge and skills relevant to established professions, there is a growing acknowledgement that nurturing entrepreneurial capabilities is essential for equipping individuals with the agility and adaptability required to prosper in dynamic environments. Researchers have explored various dimensions of this phenomenon, examining how educational interventions, pedagogical approaches and institutional environments influence individuals' entrepreneurial development. Consequently, efforts to integrate entrepreneurship into teacher educational curricula have gained momentum with initiatives ranging from dedicated courses and programs to experiential learning opportunities and ecosystem-building initiatives. Amidst these developments, it is essential to recognise that entrepreneurship education is not a one-size-fits-all endeavor. Contextual factors, including cultural norms, institutional frameworks and economic conditions, profoundly shape the design and implementation of entrepreneurship education initiatives. Therefore, a nuanced understanding of the intersection between education and entrepreneurship is critical for developing tailored interventions that resonate with diverse learners and contexts.

## Entrepreneurial Teacher Education

One of the main aims and objectives of Entrepreneurial teacher education is to equip the teacher trainees with the skills that enable them to engage in productive livelihoods. Hence, elementary entrepreneurial skills that required for our future teachers from the teacher education institution level itself as supplementary knowledge that can be put in a modular training package on the guidelines suggested by UNESCO. Some of the objectives suggested by UNESCO are:

- To make them understand the concept of entrepreneurship and its role in the education system.
- To make them know the skills required to contribute to entrepreneurship and recognise them in future teachers.
- To make them know the basic requirements for launching and operating a strong schooling system relevant to the needs of the time.
- To make them know how to translate a commercial idea into the commoditization of quality education.
- To make them know how Information Technology can be used in the smallest remote school, also.

Within these broad objectives curriculum of our teacher education system should be incorporated with long-term objectives of entrepreneurial teacher education.

## Incorporation of Entrepreneurship Education in Teacher Education

Teacher education programs should formally include entrepreneurship education as a core or elective course. The curriculum should focus on fundamentals of entrepreneurship and innovation, entrepreneurial mindset and competencies, educational entrepreneurship (innovation in teaching and learning), social entrepreneurship and community engagement, ethics, sustainability and inclusive entrepreneurship. This theoretical foundation helps prospective teachers understand entrepreneurship not merely as business creation

but as a mindset applicable in educational and social contexts. Teacher education institutions should introduce entrepreneurship pedagogy courses, promote experiential and interdisciplinary learning, encourage research in entrepreneurship education and strengthen industry-academia collaboration.

Teacher education programs should train future teachers in entrepreneurial pedagogy, which includes Encouraging inquiry, curiosity, and creativity, promoting collaborative learning and teamwork, allowing experimentation and learning from failure, supporting student-led initiatives and projects and using interdisciplinary teaching approaches which enable teachers to create innovative and learner-centred classrooms. Teacher education should focus on developing teachers as educational innovators and change agents. This can be achieved by encouraging innovation in lesson planning and assessment, supporting student teachers to design low-cost teaching aids, promoting classroom-based innovations, integrating ICT and digital tools creatively, encouraging reflective practice and continuous improvement, which empowers teachers to initiate positive changes within schools and communities. Practical exposure is essential for developing an entrepreneurial mindset. Teacher education programs should include school internships focused on innovative teaching practices, community-based projects addressing local educational issues, collaboration with NGOs, startups, social enterprises and Observation and participation in innovative schools. These experiences help student teachers understand real-world challenges and develop solution-oriented thinking.

For successful implementation, teacher educators themselves must be trained in entrepreneurship education. This can be achieved through professional development programs and workshops, exposure to entrepreneurial pedagogy and innovation practices, collaborative research and action research projects, and participation in national and international conferences hence well-trained teacher educators serve as role models for student teachers. Digital tools can significantly enhance entrepreneurship education in teacher training programs by providing access to online courses and MOOCs, encouraging digital content creation, using learning management systems for collaborative projects, promoting virtual simulations and innovation. Effective incorporation of entrepreneurial mindset curriculum requires supportive policies and institutional commitment aligned with national education policies, Institutional vision for innovation and entrepreneurship, adequate funding and resources, establishment of innovation cells and incubation units.

## Conclusion

Developing an entrepreneurship mindset through education is essential for addressing contemporary socio-economic challenges. Education systems must shift from content-centric approaches to competency-based and experiential learning models. Teacher education plays a pivotal role in this transformation. By integrating entrepreneurship education holistically, institutions can empower students to become innovative, flexible and socially responsible citizens. Incorporating an entrepreneurial mindset curriculum into teacher education programs is essential for preparing teachers who can nurture creativity, innovation and self-reliance among learners. By integrating entrepreneurship education into the curriculum, adopting experiential pedagogies, reforming assessment practices and providing institutional and policy support, teacher education programs can produce teachers who are not only effective educators but also innovators and change makers.

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# University-Industry Linkage for Fostering Startup Ecosystem in Higher Education Institutions

**D Raja Jebasingh* and L S Sridhar****

*"The success of Startup India reflects that today's India is dynamic, confident and future-ready. As we mark this journey, we reaffirm our commitment to continue fostering an entrepreneurial ecosystem that uplifts every dream and contributes to Aatmanirbhar Bharat.*"

-Hon'ble Prime Minister Shri Narendra Modi

The landscape of University-Industry linkage (U-I-L) in India has transformed into a vibrant ecosystem. In the pursuit of building a robust ecosystem for entrepreneurship/start-ups in India, the instruments of industry-academia linkage play a pivotal role. Ultimately theses these linkages are crucial to driving innovation, fostering economic growth, and addressing the country's socio-economic challenges.

India's rank in the Global Innovation Index (GII) has improved notably from 81st in 2015 to 39th in 2024, a testament to the country's commitment to fostering innovation. The synergy between academic institutions and industry has emerged as one of the most significant components of India's research and innovation (R&I) journey. Over the decades, these partnerships have demonstrated the ability to translate research outcomes into tangible societal benefits, spanning from advancements in healthcare and rural technologies to sustainable agriculture and digital solutions. *(https://psa.gov.in*)

## NEP–2020 and Entrepreneurship

The National Education Policy–2020 (NEP–2020), introduced by the Government of India, recognises the importance of fostering strong linkages between universities and industries. The NEP–2020 aims to create a seamless bridge between academia and industry, fostering innovation, employability, and economic growth. By strengthening the university-industry linkage, the policy seeks to develop a workforce that is skilled, adaptable, and capable of contributing to the Nation's development.

## Startup Ecosystem and HEIs

With more than 1.59 lakh startups recognised by the Department for Promotion of Industry and Internal Trade (DPIIT) as of January 15, 2025, India has firmly established itself as the third-largest startup ecosystem in the world. This vibrant ecosystem, driven by over 100 unicorns, continues to redefine innovation and entrepreneurship on the global stage. Major hubs like Bengaluru, Hyderabad, Mumbai, and Delhi-NCR have led this transformation, while smaller cities have increasingly contributed to the nation's entrepreneurial momentum. (*https://www.pib.gov.in/PressReleasePage*)

The integration of innovation, startup, and incubation initiatives in educational institutions and universities has been influenced by several factors. Among the criteria used in the National Institutional Ranking Framework (NIRF) assessment by the Ministry of Education, Government of India, are measures related to the development of Innovation and Entrepreneurship in higher education institutions. This ranking initiative, along with the requirement for establishing Institute Innovation Councils (IICs), has encouraged educational institutions to implement innovation and entrepreneurship programs[1].

Various government initiatives aimed at fostering innovation and entrepreneurship have provided initial funding for the creation of incubators within educational and research institutions, as well as initial financial backing for startups. Educational institutions have begun to integrate innovation and entrepreneurship into their curricula and extracurricular activities to enhance their reputation. Entrepreneurship clubs (e-cells), incubation centres, and activities related to innovation and startups on academic campuses have become as commonplace as delivering education[2].

The past decade has seen a remarkable increase in entrepreneurship in India. Innovations

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in both technology and business have propelled this growth. Indian startups are not only making an impact locally but are also gaining recognition on the global stage. Although the liberalisation in the early 1990s established a favourable climate for businesses and entrepreneurship, it wasn't until the early 2000s that the government began to promote entrepreneurship through formal incubator support programs[3]. By the middle of the last decade, there was a significant rise in startups and government-backed incubator schemes at both the central and state levels. These government initiatives were primarily carried out in collaboration with academic and research institutions. Consequently, academic and R&D institutions began to implement new strategies aimed at fostering entrepreneurship on their campuses. It is estimated that there are over 1,000 business incubators across the nation, with most of them being hosted by or affiliated with academic institutions, including technology and engineering colleges, public and private universities, government-funded research laboratories, and medical organisations[4].

Table-1 summarises the main institutional mechanisms that nurture entrepreneurship in India at both the central and state levels. It highlights specialised promotional agencies, financial institutions and development organisations that provide policy support, credit, training, infrastructure and advisory services to micro, small and medium enterprises and new entrepreneurs.

## Potential Opportunities to Create the Startup Ecosystem in Higher Education Institutions (HEIs)

1. Establishment of Industry Innovation and Entrepreneurship Centres (IIECs) to foster an effective academic entrepreneurial eco-system
2. Encourage setting up Institutional Incubation Centres (IICs): To source funds from DST, DBT/ BIRAC, NITI Aayog, MeitY, etc.
3. Offering Entrepreneurial-Based Programmes at UG and PG Level
4. Industry Seed Money Fund: supporting potential innovative ideas from the students/researchers, Industry and application-oriented research projects, with financial support to industry-relevant research activities of the university.
5. Cluster-based R&D Centres: Addressing the technological needs of the region in association with the Micro, Small & Medium Enterprises (MSME)/ Dept. of Industries of state governments.
6. Startup Bootcamp - connects visionary founders with conscious MNCs, their corporate leaders, experienced mentors and impact investors
7. Conducting University-Industry Summits
8. Industry endowments: Endowments for the creation of advanced facilities and a vocational training centre.

**Table 1: Major Institutional Support Systems for Entrepreneurs in India**

| Level | Category | Key Institutions |
|---|---|---|
| Central | Promotional agencies for small industries | Small Scale Industries Board (SSIB); National Small Industries Corporation (NSIC); Small Industries Development Organisation (SIDO); Khadi and Village Industries Commission (KVIC) |
| Central | National-level support organisations for MSMEs and entrepreneurship | National Institute for Micro, Small and Medium Enterprises (NIMSME); National Science and Technology Entrepreneurship Development Board (NSTEDB); National Bank for Agriculture and Rural Development (NABARD); National Productivity Council (NPC); National Institute of Entrepreneurship and Small Business Development (NIESBUD); Small Industries Development Bank of India (SIDBI); Entrepreneurship Development Institute of India (EDII) |
| State | State-level promotional departments and agencies | Directorate of Industries (DIs); District Industries Centres (DICs); State Financial Corporations (SFCs); State Industrial Development/Investment Corporations (SIDC/SIIC); State Small Industries Development Corporations (SSIDC) |

Source: *Compiled from Secondary Information*

9. Professor of Practice (PoP): Engaging Professors of Practice in Universities and Colleges.
10. Training opportunities and apprenticeship opportunities in the industries in Collaboration with Confederation of Indian Industry (CII)/ Federation of Indian Chambers of Commerce & Industry (FICCI)
11. Sustainability Linkage System: Financial sustainability: Attract CSR funding from industry (local/national level): Industry associations play a significant role.
12. Setting up entrepreneurship/start-up Centres of excellence
13. Seed funding and financial support to aspiring entrepreneurs at the institutional level
14. Alumni engagement – Mentoring Programme

## Conclusion

The Strong University–Industry collaboration to stimulate and foster development, noting that such progress would also require government intervention. It involves the collaboration of Industries and Universities in various areas that would foster the research ecosystem in the country and enhance the growth of the economy, industry and society at large. Indian Higher Education Institutions (HEIs) have tremendous potential to re-embark on the path of accelerated growth, supported with effective and strong linkages with industry for accelerating economic growth in the long run. Further, it is very important that the policy implementation at the Ministry as well as in the States can play a catalytic role in strengthening industry-academia linkages to further boost our innovation ecosystem for new vibrancy and opportunities for partnerships that will continue to drive in shaping the nation's entrepreneurship, business and technological innovation. To conclude, there is a need, now more than ever, to transform the start-up ecosystem in the Higher Education Institution (HEIs) campuses, and the effort needs to be taken to evolve the right policy mechanism and to get funding for breakthrough ideas.

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# Reimagining Higher Education for a FinTech-Powered India: Academia–Industry Action

**Vaishali Ojha***

The Global FinTech Fest (GFF) 2025, held in Mumbai, marked a defining moment for India's higher education sector. It reinforced Prime Minister Narendra Modi's vision of India as a global FinTech leader powered by youth, innovation, and inclusive digital infrastructure. This article explores how universities and colleges can become active partners in realising that vision through curriculum innovation, research collaboration, and industry engagement. The article demonstrates how academia–industry collaboration can translate PM Modi's GFF 2025 vision into campus practice.

India's FinTech landscape has evolved from a promising start-up niche into a structural pillar of the economy, reshaping how citizens save, spend, and access financial services. Valued at over *USD 112 billion in 2024* and projected to exceed *USD 550 billion by 2030*, the sector's expansion reflects India's deep digital penetration, robust payment infrastructure, and forward-looking regulatory environment. In FY 2024–25 alone, FinTech NBFCs disbursed more than *10.9 crore personal loans,* channelling over ₹1 lakh crore into the economy and expanding credit inclusion to millions of first-time borrowers. This scale of transformation was evident at the *Global FinTech Fest (GFF) 2025*, which hosted more than *80,000 participants and 800+ speakers* from across the world, and an unprecedented convergence of policymakers, innovators, investors, and academics. The deliberate focus on *Digital Public Infrastructure (DPI),* sustainability, and responsible innovation while steering clear of speculative crypto signalled India's commitment to building a *trusted, inclusive, and technology-driven financial future*. Against this backdrop, universities and colleges are no longer peripheral observers; they are becoming the *core enablers* of India's FinTech revolution. The *Global FinTech Fest (GFF) 2025* was not merely an event; it was an articulation of India's *digital destiny*. Held in Mumbai, the fest brought together policymakers, investors, innovators, and academics under one shared purpose to advance India's FinTech leadership on the global stage. Yet, amid the high-energy discussions on AI, blockchain, and ESG finance, one message stood out clearly: the transformation India seeks will be sustained only if its universities and colleges become co-architects of that change.

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## From Vision to Action

In his inspiring address, Prime Minister Narendra Modi urged the nation to move "*from innovation to inclusion, from policy to practice, and from technology to trust*." The Prime Minister's words underline the central role of education in this digital transition. Universities, once seen as knowledge repositories, must now evolve into innovation ecosystems that blend financial literacy, technological agility, and ethical responsibility.

Higher education, therefore, is no longer about *what* students learn but *how* they learn to apply it in a rapidly digitising economy.

## Curriculum for the FinTech Generation

The FinTech revolution has transformed the skill landscape. Finance now converses fluently with data analytics, cybersecurity, and behavioral science. To keep pace, universities need to:

- Introduce FinTech-focused electives and micro-credentials across management, commerce, and engineering programs.
- Design capstone projects with FinTech startups and incubators, fostering applied learning through live business challenges.
- Collaborate with regulators and banks to co-develop modules on digital lending, compliance, and emerging technologies such as blockchain or reg-tech.

Such measures ensure that students don't just study innovation, they practice it.

## Partnerships that Progress Power

The most vibrant insight from GFF 2025 was that the future belongs to collaborative ecosystems.

FinTech firms seek fresh research and talent; universities seek relevance and reach. Together, they can create:

- Universities that can host *in-campus regulatory sandboxes*, in collaboration with regulators or local financial authorities, where student or startup prototypes can be validated in controlled settings.
- Joint research chairs and centers of excellence on digital finance, sustainability, and inclusion.
- Continuous-learning programs that reskill working professionals and empower students with hands-on industry exposure.

This is not a theoretical reform; it is the groundwork for industry-ready graduates and research-driven enterprises.

**Human Infrastructure for Digital India**

Beyond coding and compliance lies a deeper responsibility shaping citizens who innovate responsibly. Courses embedding AI ethics, data privacy, and sustainable finance can create professionals who blend economic acumen with moral clarity. When students learn to balance profitability with purpose, they embody PM Modi's vision of "*technology with trust"*, the true foundation of India's FinTech credibility.

**Toward a Future-Ready Campus**

Across India, universities are already experimenting: interdisciplinary FinTech labs, student innovation clubs, and hackathons are energising campuses. But the next leap must be the structural mainstreaming of FinTech literacy across all streams of higher education.

Whether a student studies economics or engineering, understanding the digital flow of money, data, and ethics is now essential. This holistic approach will make Indian graduates globally competitive while positioning India as the intellectual hub of the FinTech world. *"India's FinTech revolution will succeed not in the boardrooms of banks alone, but in the classrooms of its universities."*

GFF 2025 made one thing abundantly clear: India's FinTech future will be shaped not just in startup hubs, but in *universities, labs, classrooms, and communities.* The emerging narrative is not of academic isolation, but of *academic authority* where universities design, test, critique, and lead.

By embracing modular credentials, industry co-design, DPI integration, and pilot deployments in underserved areas, Indian higher education can do more than ride the FinTech wave; it can *steer it.* Let the promise of GFF 2025 become campus reality, let PM Modi's digital vision materialise in classrooms, and let India's next generation lead global FinTech not just as consumers, but as creators.

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## To Our Readers

Knowledgeable and perceptive as they are, our contributors must not necessarily be allowed to have the last word. It is for you, the readers, to join issues with them. Our columns are as much open to you as to our contributors. Your communications should, however, be brief and to the point.

Dr Sistla Rama Devi Pani, Editor

# India's Startup Ecosystem: An Incredible Opportunity for University Students[#]

**Kartick Das***

According to the United Nation's estimates, India, home to 1.4 billion people, has surpassed mainland China to become the world's most populous country. Malin & Tyagi (2023) observed that India has potential advantages, especially at a time when countries around the world are facing declining birth rates and tight labour markets. India is home to more than 600 million people aged between 18 and 35, with 65% under the age of 25. India's demographic dividend is expected to persist at least until 2055–56 and will peak around 2041 when the share of the working-age population - 20-59 years - is expected to hit 59%. Hon'ble Prime Minister Shri Narendra Modi has envisioned India to be the skill capital of the world and called entrepreneurs India's 'growth ambassadors'. The nation's ambitions to become a global manufacturing hub are closely linked to its ability to upskill its youths. A startup system is an interdependent system of communities, organisations, resources, and service providers that support their growth and this system is known as the 'Startup Ecosystem'[1]. Universities play a key role in this startup ecosystem as Enginsy (2023) rightly observed universities act as a talent reservoir and contribute to knowledge transfer, incubation and networking. A startup is a new business founded by one or more entrepreneurs to develop a unique product or service and bring it to market in its early stages, typically characterised by high uncertainty and risk. But they also have the potential to grow quickly and generate significant returns for their founders and investors as it is supported by innovation, creativity and an agile approach to growth. In this paper, we'll take a closer look at how the startup ecosystem works and will explore the role of universities in startup ecosystems.

Higher Education Institutions play a fundamental role in nurturing talent and setting the next generation of entrepreneurs and startup employees on their paths. Prasad (2023) opined that the traditional role of universities is to provide education and research, but in recent years, there has been a shift towards developing start-up ecosystems within universities. Colleges and universities offer entrepreneurship studies, courses on management and innovation, digital marketing programmes, etc., and are paving the way for bright minds to turn their ideas into new businesses and opportunities. Deshpande and Guthrie (2019) intended to provide an overview of the key concepts associated with an entrepreneurial-university ecosystem. It also briefly discusses the entrepreneurial university ecosystem and potential data sources to analyse such an ecosystem. Hassan (2020) analysed the link between universities and business incubators to determine how students, scientific researchers and entrepreneurs can benefit from this linkage. The success ratio of startups is very low and not many people talk about the hardships of the journey (Shetty 2019). Startup develops within a successful ecosystem that needs a supportive home to be able to flourish. A successful startup ecosystem needs structural necessities like funding and governmental policy support as well as the experts that are part of the ecosystem.

## Startup India

The Startup India initiative was announced by the Prime Minister of India on 15th August 2015. This campaign was introduced under the Government of India as an initiative to develop over 75 startup support hubs in the country to build a strong ecosystem for nurturing innovation that will drive sustainable economic growth and generate large-scale employment opportunities. Startup India is a lead activity initiated by the government to catalyze startup culture and construct a solid and comprehensive environment for advancement and business in India. Since its inception, Startup India has revealed several projects with the goal of supporting business visionaries and changing India into a nation of employment makers. An Action Plan for Startup India was unveiled by the Prime Minister of India on 16th January 2016. It comprises 19-point action items spanning across

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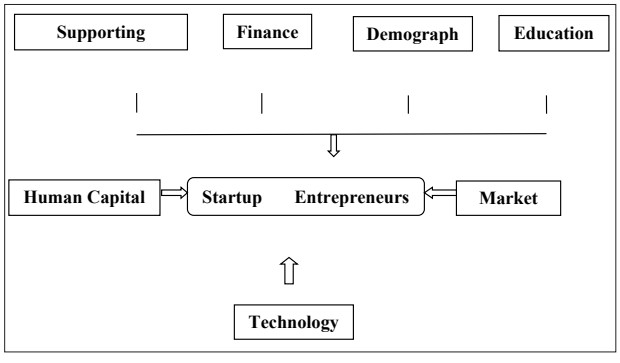
areas such as "Simplification and handholding", "Funding support and incentives" and "Industry-academia partnership and incubation" organized by the Department for Promotion of Industry and Internal Trade, focusing both on restricting hindrances and promoting faster growth by way of:

- Providing funding support and incentives to the various start-ups of the country.
- To provide Industry-Academia Partnership and Incubation.
- Simplification and Handholding

The Action Plan aims to provide an environment for startups to thrive in the country and make India a hub for innovation and entrepreneurship. One of the key pillars of the initiative is the Startup India Hub, an online platform that serves as a one-stop-shop for all stakeholders in the startup ecosystem to act as the facilitator for the entire startup ecosystem, enable knowledge exchange among various stakeholders, and enable a Startup Revolution at a national level. The team is hosted under Invest India, the National Investment Promotion and Facilitation Agency of the Government of India. Startup India offers a comprehensive suite of benefits spanning the entire lifecycle of startups starting from connecting aspiring entrepreneurs to mentors and academic institutions, mature startups to Incubators and Investors, scaling startups to Corporate and Government & Industry Bodies. The major objective of Startup India is to get over some of the restrictive government policies which include:

1. License Raj
2. Land Permissions

**Fig-1: Key Elements in a Startup Ecosystem**




*Source: Tripathi et al. 2019*

3. Foreign Investment Proposals
4. Environmental Clearances

The most successful startup ecosystems have a strong shared vision and a mission to foster innovation in their local community - be that a specific city, a region, or a complex of buildings - and use the pool of resources available to them to create and scale new businesses. Startups breathe, live, and grow within successful ecosystems. They cannot survive on their own and need a supportive home to be able to flourish. A startup ecosystem is a complex and interconnected structure that operates well when everything is in balance.

**Fig-2: Ingredients of a Start-Up Ecosystem**

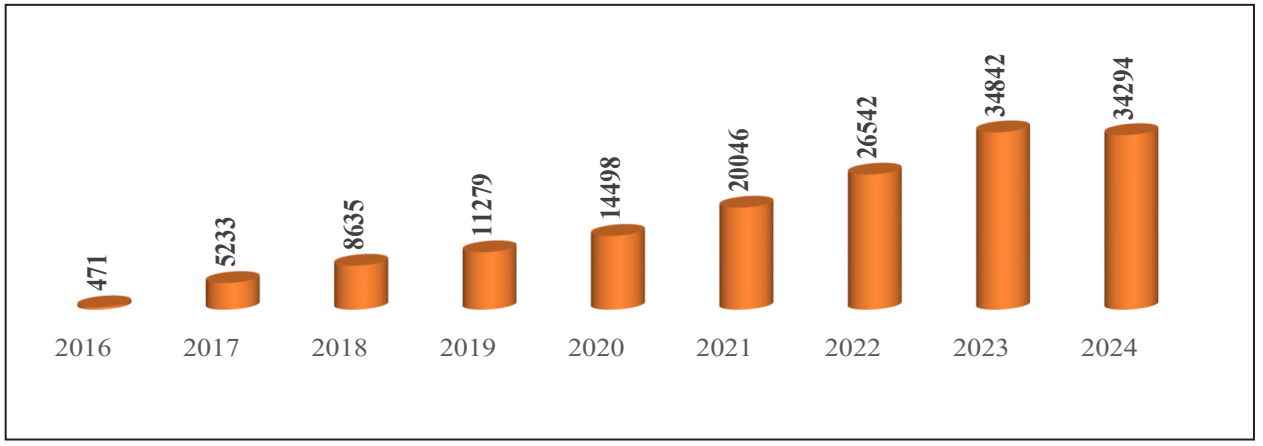
| |
|---|
| Supportive Government Policies |
| Culture of risk-taking and experimentation |
| A strong pool of entrepreneurial talent |
| A robust infrastructure environment |
| A vibrant community |

## Third-Largest Startup Ecosystem

According to the NASSCOM Start-up report India has the third largest start-up ecosystem in the world**;** a development that Hon'ble Prime Minister Shri Narendra Modi believes will chart the country's course towards becoming a developed nation by 2047(Figure-3). Unconventional sectors also marked their entry into the unicorn space including, NBFCs, Conversational Messaging, Cryptocurrency Exchanges, Cloud Kitchens and many others. Indian unicorns are also listed on the stock exchange and some of the big unicorn names that offered an IPO include Zomato, Nykaa, PolicyBazaar, Delhivery, Paytm and Freshworks. As of 31 December 2023, as per official estimates, there were approximately 117,254 startups recognized by the Department for Promotion of Industry and Internal Trade (DPIIT), including an estimated 111 unicorns[2] with a total valuation of $349.67 billion. Out of the total number of unicorns, 45 unicorns with a total valuation of $ 102.30 billion were born in 2021 and 22 unicorns with a total valuation of $29.20 billion were born in 2022[3].

India's largest startup event, the Startup *Mahakumbh*, concluded on March 20, 2024 in New Delhi, supported by DPIIT, Invest India, and MeitY Startup Hub (MSH), witnessed stalwarts from

**Fig 3: Number of Government-recognised Startups (Financial Year 2016 to 2024)**




*Source: i) Startups in India - Statistics & Facts*
*https://www.statista.com/topics/4839/startups-in-india/*
*ii) http//:www.dpiit.gov.in*

industry and government discuss the role of startups in realising the vision of '*Viksit Bharat'* by 2047 - the government's ambitious plan to make India a developed nation by its 100th year of independence. Addressing the action-packed gathering, the PM highlighted the unprecedented growth of India's startup culture and commented that this growth is not limited to metro cities; it has become a social culture, with young entrepreneurs bringing their innovations to small cities as well. To celebrate and further encourage this growth, PM Modi designated startups as the "backbone" of New India and declared January 16th as National Startups Day. The Government of India has undertaken several initiatives and instituted policy measures to foster entrepreneurial culture in the country such as:

- Startup India
- Make in India
- Atal Innovation Mission
- Support to Training and Employment Programme for Women
- Jan Dhan- Aadhaar- Mobile
- Digital India
- Biotechnology Industry Research Assistance Council
- Department of Science and Technology
- Stand-Up India
- Trade-related Entrepreneurship Assistance and Development
- Pradhan Mantri Kaushal Vikas Yojana
- National Skill Development Mission
- Science for Equity Empowerment and Development

## Role of Education Institutions

India's population is among the youngest in an ageing world. India's working-age population has numerically outstripped its non-working-age population. Campuses are the ideal place to cultivate an entrepreneurial ecosystem and mindset since this working-age population consists of highly motivated youths with diverse aspirations that need to impart quality education and train them for future opportunities. Today's universities have entrepreneurship courses, deep research, talent human resources and extensive co-curricular opportunities for budding entrepreneurs. Higher education institutions act as a bridge between businesses and startups, collaborating to create cutting-edge knowledge and play a crucial role in developing a startup ecosystem by providing entrepreneurial education, creating a supportive environment, and facilitating knowledge sharing. They train students in entrepreneurship, develop a culture of innovation and support startups through mentoring, training programs, and startup competitions. By adapting their traditional role and focusing on knowledge sharing, universities can facilitate the commercialization of innovations and provide resources for startups to access new markets. Overall, universities play a vital role

**Table-1: Role of Universities in Startup Ecosystems**

| Role | Detail |
|---|---|
| ***Universities can partner with industries to benefit the talent pool*** | University is the centre of theoretical and practical knowledge and companies complement each other in ways that can benefit both current employees and students, i.e., future employees. Company leaders could bring their wisdom to students for one-off guest lectures, full courses as adjuncts, or team-teaching with faculty that includes bringing industry experts to campus and university faculty to companies. |
| ***Transfer of specialized knowledge*** | Transfer of specialized knowledge significantly contributes to product development and innovation and helps to develop an ecosystem of startups through academic research, cutting-edge technology, and specialized knowledge. |
| ***University business incubators as a tool for accelerating entrepreneurship*** | The relationship between universities and incubators is necessary as universities are the source of knowledge, research, resources and today's innovation-driven centers. The educational system should create a favorable environment that enables young people to develop their mindset from employees to employers and to prepare them to improve skills and knowledge to create jobs. |
| ***Developing intellectual property*** | Universities encourage creativity and innovation that helps in inventions, literary and artistic works, designs, symbols, names and images that can be licensed or transformed into startups which enable students to earn recognition or financial benefit from what they invent or create. |
| ***Facilitate networking while at university*** | University is a great place to start building a strong network of academicians who can help with future career paths by hosting events, workshops, seminars, and conferences. Startups can connect with potential partners, customers, suppliers, and other stakeholders through these events, expanding their network and opportunities. |

in nurturing and supporting startups, driving innovation, and contributing to the growth of the startup ecosystem (Table-1).

## Obstacles

India is going through the era of startups, where the country is creating a robust ecosystem for businesses and entrepreneurs. India is now called the 'Startup Hub' as the government told the Parliament that 1,14,902 entities were recognised as startups under the flagship Startup India initiative, as of October 2023. Despite the achievements, India's **Startups** face several obstacles, such as a lack of skilled workers, bureaucratic obstacles, and stiff competition from established businesses. While speaking out about his experience, Chief Mentor and Founder of PadUp Venture Shri Pankaj Thakar[4] said it is saddening to see 95% of the start-ups failing and only 5% tasting success. Start-ups often face difficulty raising funds due to the lack of collateral assets used as security against potential losses as traditional banks and financial institutions consider them to be high-risk ventures. Without collateral, lenders and investors may perceive the venture to be high-risk, making it more challenging to raise funds. According to a recent report, venture capital funding in India fell to a 21-month low in the July-September quarter, with just $2.8 billion raised in 387 deals, as opposed to $9.8 billion raised in 525 deals during the same period last year (Gupta 2022).

## To Conclude

Indian Startup ecosystem has expanded from about 340 to more than 1,15,000 between 2016 and 2023 after the launch of the Startup India Initiative under the DPIIT in 2016. The demography of India in terms of its young age population and diversity for creating innovations has helped in achieving a robust, viable, and continuously evolving startup ecosystem with the rapid growth of unicorns across different strategic sectors such as Defence, Space, etc. A vibrant start-up ecosystem has a significant impact because it empowers students

to develop their entrepreneurial skills and create successful start-ups. By providing students with access to resources, support, practical experience, networking opportunities, and job opportunities, universities can help bridge the gap between innovation and commercialisation. Universities are key players in startup ecosystems, acting as talent reservoirs and contributing to knowledge transfer, incubation, and networking by commercializing cutting-edge research and technology cannot be overstated. In the words of Hon'ble Prime Minister Shri Narendra Modi: Startup India is a revolutionary scheme that has been started to help the people who wish to start their own business. These people have ideas and capabilities, so the government will give them support to make sure they can implement their ideas and grow. The success of this scheme will eventually make India, a better economy and a strong nation

## Notes

1. The first recorded use of the word 'startup' was in a newspaper article in 1851. The word was used to describe a new business or enterprise.
2. A 'unicorn' is a privately owned startup business worth more than $1 billion. In venture capital companies, the term unicorn is often used. The first person to use the word was Aileen Lee, who works in venture capital.
3. Available at *https://www.livemint.com/news/india/indias-startup-growth-to-pave-way-to-developed-nation-by-2047-pm-modi-11710919187*
4. Available at *http://timesofindia.indiatimes.com/articleshow/105974157.cms?utm_source=contentofinterest&utm_medium=text&utm*

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# Women Entrepreneurship in India: Strategic Roadmap for Skill-based Empowerment with Special Emphasis on Village-level Enterprises[#]

**Ojisha***

In India, women entrepreneurship has emerged as a significant driver of economic growth, employment generation, and social transformation. The 21st century is an era of numerous entrepreneurship policy interventions—such as the "Survival of a Girl to Her Journey in Becoming an entrepreneur" initiative—and a range of government programs, and women, particularly in rural and village communities, continue to grow despite formidable barriers. The development of digital public infrastructures, enormous awareness programs, skill-based education and government of India initiatives provide societal reforms, and adequate opportunities for reskilling and upskilling.

The present study draws insights from over 47 diverse research methodologies, which offer a comprehensive understanding of the current landscape of women entrepreneurship in India. Employing a qualitative, review-based approach, it explores four critical dimensions: (1) Awareness of Government Schemes, (2) Challenges, (3) Emerging Opportunities, and (4) Role of Skill Education. Each of these components is examined within a structured framework that aligns them with the broader goal of fostering sustainable entrepreneurial development to meet the UN Sustainable Development Goals.

## Blueprint of Women's Entrepreneurship Initiatives

India has introduced a wide array of financial and developmental schemes aimed at empowering women entrepreneurs, particularly those at the grassroots level. Under the Pradhan Mantri Loan Yojana, women can access credit through three tailored categories—*Shishu, Kishor*, and *Tarun*—each designed to support various stages of enterprise growth. Complementary schemes such as the Dena Shakti Scheme, Pradhan Mantri Rozgar Yojana, and the Udyogini Scheme (targeting women with nominal annual family incomes that further enhance financial inclusion.

High-value support is available through initiatives like the Cent Kalyani Scheme, Mahila Udyam Nidhi Scheme, Stree Shakti Yojana, Synd Mahila Shakti Scheme, and Mahila Coir Yojana, which provides an equipment subsidy. Social empowerment programs such as Beti Bachao Beti Padhao Yojana and initiatives like the Women Entrepreneurship Platform (WEP) by NITI Aayog foster awareness and capacity-building.

Entrepreneurial momentum is also driven by innovation-focused initiatives, including MUDRA Yojana, India Pitch-Pilot-Scale Start-up Challenge (AMRUT 2.0), National Startup Awards, Startup India Yatra Awards, Bharat Startup Grand Challenge Awards, and Youth Co: Lab Hackathon Competitions. Infrastructure and support mechanisms like PM-SETU, Bharatiya Mahila Bank Business Loan, and Orient Mahila Vikas Yojana further strengthen the women entrepreneurship ecosystem.

Additionally, schemes administered by SIDBI—such as Mahila Udyam Nidhi and Mahila Vikas Nidhi—alongside cluster-based development programs like the Micro & Small Enterprises Cluster Development Programme (MSE-CDP) and skill-building initiatives such as Training of Rural Youth for Self-Employment (TRYSEM), have significantly improved participation and knowledge dissemination. However, many CSR-based skilling programs remain concentrated in urban areas, underscoring the need for targeted capacity-building efforts in rural and village contexts to ensure *inclusive and sustainable entrepreneurial expansion.*

## An Overview of CSC Village Level Entrepreneurship

The CSC Village Level Entrepreneurship (VLE) initiative empowers rural citizens to deliver essential digital services locally, bridging the urban-rural divide through technology.

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## CSC and VLE

- Common Services Centres (CSC) are digital access points established under the Government of India's Digital India Programme, aimed at delivering e-governance, financial, healthcare, and educational services to rural and remote areas.
- A Village Level Entrepreneur (VLE) is the individual who operates a CSC. VLEs act as the frontline service providers, enabling citizens to access government and private services digitally.

## Key Roles of a VLE

- ***Service Delivery****:* Provide access to services like Aadhaar enrollment, PAN card applications, passport services, banking, insurance, telemedicine, and skill development.
- ***Digital Literacy***: Promote digital awareness and training through programs like PMGDISHA (Pradhan Mantri Gramin Digital Saksharta Abhiyan).
- ***Financial Inclusion***: Facilitate banking services through DigiPay, AEPS, and micro-ATM systems.
- ***Social Empowerment***: Function as change agents by supporting schemes like Ayushman Bharat, e-Shram registration, and pension enrolments.

## Scale and Reach

- Over 5.4 lakh VLEs operate across India, with *4.35 lakh located in Gram Panchayats,* making CSC one of the largest digital service networks in the world CSC-SPV.

## Benefits to VLEs

- ***Entrepreneurial Opportunity***: VLEs earn commissions and service fees, promoting self-employment, especially the women entrepreneurs.
- ***Training and Support****:* CSC-SPV provides onboarding, digital training, and access to the Digital Seva Portal.
- ***Community Recognition****:* VLEs often gain respect and credibility within their villages due to their role in enabling access to essential services. HR Informative CSC - JAANKARI SUVIDHA.

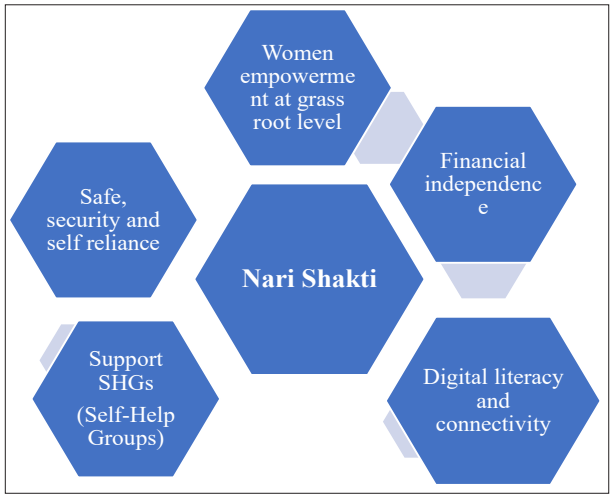
## Strategic Importance

The CSC-VLE model is a cornerstone of India's digital inclusion strategy. It not only enhances service delivery but also fosters grassroots entrepreneurship, women's empowerment, and rural development.

## *"Nari Shakti"* Entrepreneurship

*'Nari Shakti'* (translated as *Women Power*) represents a transformative movement under the ***Digital India*** and ***Atmanirbhar Bharat*** missions (Fig. 1). It seeks to enable women to become active economic agents by supporting their entrepreneurial aspirations through policy, financial, and digital interventions.

**Figure 1: Diagrammatic Representation of Nari Shakti**




Women now lead millions of SHGs, micro-enterprises, and startups across sectors like textiles, food processing, handicrafts, and digital services.

## Case Study: Self Help Groups (SHGs)

The NaMo Drone Didi Scheme is a pioneering initiative that empowers rural women by integrating drone technology into agriculture, transforming Self-Help Group (SHG) members into tech-enabled entrepreneurs.

Launched by the Government of India in 2023, the NaMo Drone Didi Scheme is part of a broader push to modernise Indian agriculture and promote women-led rural entrepreneurship. The initiative equips 15,000 women-led SHGs with agricultural drones and provides them with specialised training to operate these drones for precision farming services.

## Government-led Skill Development Programs

Ministry of Skill Development and Entrepreneurship (MSDE) runs specialised

vocational training programs for women across socio-economic groups and age brackets. These aim to stimulate employment and entrepreneurial opportunities for women.

- ***Skill India Mission*** empowers women through focused initiatives, including:
- ***Long-Term Training via ITIs****:* Over 15,000 Industrial Training Institutes (ITIs) offer one- and two-year courses, with a strong push for female enrollment.
- ***Short-Term Skill Training***: Delivered through PMKVY (Pradhan Mantri Kaushal Vikas Yojana), covering trades like tailoring, beauty, food processing, and digital services.
- ***Recognition of Prior Learning (RPL)****:* Certifies informal skills, helping women formalise their expertise.

The Swavalambini Women Entrepreneurship Programme is a structured initiative designed to empower final-year female graduates in India by cultivating entrepreneurial skills, providing mentorship, and facilitating startup incubation.

The Swavalambini Women Entrepreneurship Programme is a national initiative launched by the Ministry of Skill Development and Entrepreneurship (MSDE) in collaboration with NITI Aayog. It specifically targets female students in Higher Education Institutions (HEIs), especially those in their final year, to prepare them for entrepreneurial careers.

## Key Objectives

- ***Instil an entrepreneurial mindset*** among young women
- ***Provide structured training*** in business planning, financial literacy, and digital tools
- ***Connect students with mentors, incubators, and funding networks***
- ***Encourage self-employment and startup creation***, to enable at least 10% of participants to launch viable enterprises

The initiative is delivered in three progressive stages:

***i. Entrepreneurship Awareness Programme (EAP)***

***ii. Women Entrepreneurship Development Programme (WEDP)***

- Offers firsthand training in business model development, marketing, compliance, and digital tools.

***iii. Faculty Development Programme (FDP)***

- Trains faculty members to become entrepreneurship facilitators within their institutions

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# Role of Higher Education Institutions in Promoting Entrepreneurship and Startup in India

**Saraswati Rachayya Ratkalle***

*"Education is not just as a means to acquire literacy and skills but as one of the strongest tools to bring about social transformation."*

*"Literacy is not the end of education, nor even the beginning… it would, therefore, begin the child's education by teaching it a useful handicraft and enabling it to produce from the moment it begins its training. Education should engage the head, hand and heart."*

-Mahatma Gandhi

## Entrepreneurship in Higher Education

India is a country where importance is given to business, business skills, start-ups to provide society skills, business Ideas, employment opportunities, economic opportunities and development of society. The role of higher education Institutions is very important in developing skills and entrepreneurship to give ideas and skills of the business world. "Entrepreneurship in higher education is about equipping students and faculty with an entrepreneurial mindset and skills, creativity, problem solving, risk taking to identify opportunities, develop innovative solutions, social and commercial, and take action, fostering job creation, economic growth, and personal adaptability beyond starting a business."

"Entrepreneurship education is a recent field in education. From a field mainly related to small business, it is extended towards the enhancement of students' entrepreneurial attitudes and skills. It can support students in developing an independent and versatile way by growing the spirit of entrepreneurship".

Entrepreneurship education plays a critical role in preparing students for the ever-evolving demands of the business world. Institutions of higher education have a vital role in enhancing entrepreneurship education, equipping students with the skills and knowledge needed to succeed as entrepreneurs. In recent years, the landscape of education has evolved significantly to adapt to the demands of a rapidly changing world. One notable aspect of this evolution is the increased emphasis on entrepreneurship education at higher education institutions.

This shift towards fostering entrepreneurial mindsets and skills among students is crucial for preparing them to navigate the complex and competitive business environment of the 21st century. In this article, emphasis is given to exploring the pivotal role that institutions play in enhancing entrepreneurship education within higher education.

It involves teaching entrepreneurial behaviours and actions, supporting the creation, through incubators and integrating entrepreneurial thinking across all disciplines, not just business studies, to prepare individuals for dynamic careers. By implementing these strategies, higher education institutions can effectively nurture entrepreneurial talent, drive innovation, and contribute significantly to economic growth.

Entrepreneurship is increasingly recognised as a key driver of economic growth, innovation, job creation, and poverty reduction. In response, higher education institutions (HEIs) are gaining attention for their potential to foster entrepreneurship through specialised programs, education and training, support services, research and innovation, partnerships, and community engagement. Entrepreneurship development is the process of improving entrepreneurial skills and knowledge through organised training and institutional programmes. The primary goal is to increase the number of entrepreneurs, thereby accelerating the creation of new businesses. This, in turn, promotes job creation and stimulates economic growth.

## Core Components

- ***Skill Development*:** Teaching practical skills in business planning, financial literacy, marketing, and project management.
- ***Experiential Learning*:** Using project-based learning, case studies, simulations, competitions, and real-world community engagement.

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## Goals and Benefits of Entrepreneurship in Higher Education

- ***For Students*:** Enhances employability, provides career alternatives, develops proactive life skills, and creates additional income streams.
- ***For Universities*:** Drives innovation, integrates research with societal needs (development through research), and strengthens industry partnerships.
- ***For Society*:** Stimulates job creation, boosts economic growth, promotes new markets, and addresses social challenges.
- ***Developing Competence***

Developing entrepreneurship competence among students requires the mastery of concepts by teachers. Training teachers in entrepreneurship education helps them apply specific competences, methods, and tools to encourage confidence in learners' own capabilities and to stimulate flexibility, leadership, and initiative.

## Goals of Entrepreneurship Education

- Entrepreneurship education is vital for fostering the skills, mindsets, and behaviours needed for economic development as well as for enabling students to recognise opportunities. Consequently, the higher education system plays a pivotal role in cultivating and promoting entrepreneurial culture.
- Entrepreneurship development, such as entrepreneurship education, improves students' entrepreneurial abilities, skills, and job prospects. It also provides them with valuable ideas for launching new businesses or enhancing existing ones.
- Entrepreneurship education encompasses a wide range of activities and programmes aimed at fostering entrepreneurial skills and mindset among individuals. It involves equipping students with the knowledge and tools needed to create and manage ventures successfully.
- Higher education institutions foster entrepreneurial behaviours by raising awareness and encouraging the generation and implementation of ideas from idea generation to execution. Higher education institutions support aspiring entrepreneurs, including both students and staff, by offering opportunities.
- Higher Education Institutions play a critical role in fostering entrepreneurial ecosystems by introducing entrepreneurship concepts at the university level aiming to inspire and motivate students toward entrepreneurial activities.
- Universities support potential entrepreneurs by connecting them to private financial services and fostering links with relevant industries.
- By instilling a culture of innovation and creativity, entrepreneurship education prepares individuals to tackle real-world problems and take calculated risks in the pursuit of sustainable business ventures.
- Universities and colleges serve as hubs of knowledge creation and dissemination, making them ideal environments for nurturing entrepreneurial talent. Higher education institutions aim to enhance the entrepreneurial skills and entrepreneurial intention of their students, thereby boosting their employability and readiness to enter the world of business.
- Higher education institutions are uniquely positioned to support and improve local startup communities, driving economic growth and innovation.

## Foster an Entrepreneurial Culture

Creating an entrepreneurial culture within the institution is essential. This involves integrating entrepreneurship into the curriculum across various disciplines, such as offering courses and workshops that equip students with the skills needed to start and run a business.

## Provide Access to Resources

Providing access to resources is a critical factor for startup success. Higher education colleges can offer a range of resources, including mentorship programmes that connect students with experienced entrepreneurs and industry experts who can provide guidance and support. Establishing incubation centres and accelerator programmes that offer workspace, funding, and professional services is also an essential resource for creating a local startup community.

## Role of Institutions in Fostering Entrepreneurship

The entrepreneurship courses offered at universities make a substantial contribution to fostering meaningful entrepreneurial activities by

educating students about the challenges and risks associated with launching new business ventures. This education provides students with a comprehensive understanding of entrepreneurship as a dynamic process, equipping them to become more competent and engaged stakeholders in the entrepreneurial ecosystem, whether investors, employees, managers, or entrepreneurs themselves.

Higher education institutions support aspiring entrepreneurs by facilitating access to private financial services, which also helps to establish connections with relevant industries. Universities organise networking events in which new entrepreneurs can interact with investors and pitch their ideas.

### Promote Community Engagement

Engagement with the local community is vital for the sustainability of startups. Colleges can encourage community involvement through projects such as integrating community-based projects into the curriculum, where students work on actual problems faced by local businesses and organisations. Collaborating with local businesses to offer internships, apprenticeships, and joint research projects is another important way to encourage community engagement.

Higher education institutions play a crucial role in fostering entrepreneurship by providing students with the necessary resources, mentorship, and networking opportunities to transform their ideas into viable business ventures. Institutions and universities provide a foundation for developing ideas and strengthening industry ties. These services include training, access to funding, mentoring, coaching, IT support, research facilities, laboratories, and affordable workspace.

By promoting a culture of entrepreneurship and innovation, institutions contribute to the overall economic growth and sustainability of society. Higher education institutions host events, such as conferences, seminars, and competitions, inviting speakers to share their experiences and offer guidance. Universities not only encourage the development of innovative ideas but also actively contribute to their implementation.

Higher education institutions also raise awareness about entrepreneurship and its diverse dimensions while actively supporting entrepreneurial initiatives in various ways. Through the effective design and implementation of entrepreneurship programs and courses, these institutions play a pivotal role in nurturing an entrepreneurial mindset among graduates.

The university hosts seminars and entrepreneurship workshops to nurture and promote an entrepreneurial mindset. Additionally, they organise comprehensive entrepreneurship training, provide essential support and recognition for entrepreneurs, conduct research on entrepreneurship, and expand technology development centres to foster innovation and growth.

### Importance of Entrepreneurship Education in Higher Education

Entrepreneurship education is instrumental in shaping the business skills of higher education students. By equipping students with entrepreneurial skills, knowledge, and mindset, institutions enhance their readiness to enter the competitive market. In today's dynamic business environment, possessing entrepreneurial skills can give a distinct advantage, making one more desirable across various sectors.

### Impact of Entrepreneurship Education on Employability

Entrepreneurship education significantly impacts the employability of graduates by instilling in them the ability to think creatively, solve problems, and take calculated risks. These skills are highly valued by employers seeking innovative and adaptable professionals who can contribute to the growth and success of their organisations. Higher education institutions serve as breeding grounds for future entrepreneurs by providing a conducive environment for nurturing entrepreneurial talent. Through specialised programmes, workshops, and mentorship opportunities, institutions cultivate the entrepreneurial mindset and skills of students, empowering them to pursue their business ventures with confidence and resilience.

### Implementing Entrepreneurship Education in Higher Education Institutions

Effective implementation of entrepreneurship education in higher education institutions requires strategic curriculum development that aligns with the evolving needs of the business landscape. By designing comprehensive entrepreneurship programmes that combine theoretical knowledge

with practical experiences, institutions can equip students with the necessary skills to succeed in the entrepreneurial realm.

## Role of Higher Education Institutions in Entrepreneurial Community Engagement

Higher Education Institutions (HEIs) play an essential role in promoting community engagement by connecting academic expertise to societal needs. Their contributions include service-learning programs, collaborative research, public outreach, and advocacy, which not only address critical societal challenges but also enhance universities' social responsibility.

HEIs also act as centres for innovation and knowledge transfer, supporting economic growth by collaborating with community stakeholders. They provide essential resources, such as research, technology, and training, to address challenges in health, education, and environmental sustainability. Higher Education Institutions support entrepreneurship in underserved communities by providing resources, mentorship, and training to minority and women-owned businesses.

They enhance human and social capital by offering opportunities for business, education, and networking. HEIs align their resources to promote economic and social equity through partnerships with governments, corporations, and community organisations.

Entrepreneurship and innovation are now seen as key forces behind economic growth, job creation, and societal advancement in the rapidly evolving global economy of today. In order to encourage entrepreneurship and innovation in higher education, partnerships and collaboration are extremely important. Collaborations between academia, business, the government, and the general public can foster knowledge transfer, establish synergies, and provide teachers and students with useful resources. Providing mentorship and guidance from industry experts allows students to learn from experienced entrepreneurs and professionals, gaining valuable insights into the practical aspects of running a business.

## Conclusion

Entrepreneurship education within higher education institutions plays a vital role in shaping the entrepreneurial mindset, skills, and capabilities of students. By fostering innovation, creativity, and a proactive approach to problem-solving, institutions prepare graduates to excel in the dynamic and competitive business environment. They create a training environment that allows young people to cultivate the mindset and skills essential for entrepreneurship while also providing career guidance to support the transition from education to business start-up and beyond. HEIs effectively contribute to shaping a positive entrepreneurial mindset and empowering students to launch innovative companies, which enhances the competitiveness of economies. Furthermore, HEIs are key to nurturing entrepreneurship through knowledge creation, dissemination, and practical support for young entrepreneurs. Higher education institutions are increasingly recognised for their potential to foster entrepreneurship development through specialised programs, education and training, support services, research and innovation, partnerships, and community engagement.

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# Lighting the Fire: The True Purpose of Education

**Neville G Pinto, President, University of Cincinnati, Ohio, United States delivered the Convocation Address at the 34th Convocation Ceremony of the Nirma University, Ahmedabad, Gujarat on November 19, 2025. He said, *"Charge after your goals, but do not go alone. Go with others. Learn from them. Experience your life and your relationships to the fullest. And perhaps most importantly, do not forget to bring along your distinctly human self — the same one who has carried you to this very moment."* Excerpts**

Good afternoon, everyone!

What a joy and an honour it is to be here with you on this truly special occasion, your Convocation Day.

Today is a special day, and it would not be possible without the academic leaders, including all the deans, faculty and staff of the university. You are the mentors and scholars who make Nirma a special place and a vital centre of excellence.

Graduates, this is your day. You've worked hard to get here, and we are here to celebrate your efforts. This space is full of joy, pride, and excitement because of what you've achieved. Enjoy every moment.

To everyone at Nirma, I bring warm greetings from your friends at the University of Cincinnati. Our strategic partnership with Nirma is one of mutual admiration and shared purpose.

I'm pleased to tell you that earlier this year our universities signed articulation agreements to educate students in Computer Science as well as Pharmacy. This has led to our very first cohort of 8 Nirma students who are currently studying with us at UC.

Next, we are expanding our relationship to include Mechanical Engineering, and we have plans to add additional disciplines. We consider this an incredible opportunity to partner with a truly special university.

During my first visit to Nirma in January, I was struck immediately by the beauty of this campus and — even more so — by the warmth of its people. There is a sense of purpose here and an energy that is truly undeniable.

We are separated by more than 12,000 kilometres, so my long flight home after my last trip allowed me time to ponder the incredible projects and progress I witnessed while on your campus. I will speak more about those projects and their impact in a moment.

First, I'd like to convey a more human moment with each of today's graduates: Students, you and I are separated by 45 years. I was sitting in your seat earning my bachelor's degree as a graduating student from India in 1980.

I must tell you; this country's prosperity and tremendous advancements have been abundantly evident — even on a global scale. This much has been clear to me even from a distance. But seeing India up close, right here on your campus in fact, I noted evidence of changes that may not be evident to those of you who are immersed in this culture each day.

As just one example, during my last visit I was honored by Nirma University with a National Cadet Corp march past. I couldn't help but notice the NCC contingent of mostly men was led by a female cadet. This was nearly unimaginable when I was a college student, or certainly unlikely. This is admittedly a small observation. Still, it gives me great pride and confirms that Nirma University is an institution that is educating the next generation with values and opportunities that should make all of us proud.

I noticed many things during my trip — from the sophisticated underwater drones your students are building to Nirma's efforts to define the future of rocket flight. Quite literally, from the depths of the ocean to the edge of the sky.

Everywhere I look at Nirma, there is a seamless blend of technology and artistry, of logic and beauty. It is impossible not to be inspired by the sheer span of thought. Nirma University has clearly been purposefully built — already a living legacy of vision and service. Founded just 22 years ago through the

foresight and philanthropy of Dr. Karsanbhai Patel, Nirma has grown into a Centre of Excellence, recognised nationally and globally for its academic rigour and alignment with industry and innovation.

It is also a comprehensive university, spanning fields as diverse as engineering, management, law, pharmacy, architecture, design and science. Through its industries, Nirma revolutionised access to affordable, high-quality products — bringing dignity and comfort to millions of households. Through its university, it has cultivated thinkers, innovators, and leaders who serve not only India but the world. Nirma stands as a symbol of vision, values, and impact.

Graduates, education, at its best, is not only about earning a degree— it's about discovering who we are as human beings and how we can serve others. This is a universal truth.

You represent society's next leaders who will define success and bring hope to our world. Nirma's motto, "From darkness, lead me to light," reminds us that education is a lifelong calling — a way of illuminating not only our minds but also the lives of others. The Irish poet William Butler Yeats once said, "Education is not the filling of a pail, but the lighting of a fire." That fire, Yeats would say, — your curiosity, your compassion, your courage — is what will sustain you far beyond this ceremony.

Students, you are graduating at a remarkable moment in history. The world is changing faster than ever — driven by technology, artificial intelligence and global interconnection. We are experiencing tectonic shifts toward what will eventually be a new global order in which, I believe, this country will have an especially important leadership role.

I am confident, as I'm sure your professors are, that you are ready — ready not only to adapt but to lead. Because the real value of education is not that it gives you answers, but that it equips you to ask better questions. I challenge each of you to ask important questions in your life.

Asking astute questions begins with recognising your place in our future. Most of you, I would guess, are in your 20s. By 2050, you'll be in your 40s or early 50s — an age when leadership becomes not an aspiration but a responsibility. The choices your generation makes, the integrity with which you will lead, will shape the world we all will inhabit.

To imagine that world, let's look briefly ahead. Global population, now past eight billion, will approach 10 billion by the middle of the century. Nearly 70% of those people will live in cities, many of them dense megacities. That means your daily lives — and the systems you manage — will most likely be deeply urban, interconnected and increasingly dependent on technology.

Machines will handle most physical tasks, and even routine cognitive ones. What will set you apart won't be how much you know, but how creatively you can think and how boldly you can innovate. The most successful organizations will be those that integrate human insight and machine intelligence seamlessly — each amplifying the other. And with that integration, the pace of change will accelerate beyond anything we've known.

As Justin Trudeau, the former Prime Minister of Canada, said not long ago: "The pace of change has never been this fast, yet it will never be this slow again."

This rapid transformation also means that learning can't end with a degree. Knowledge will remain the currency of success, but its value will depend on your willingness to keep it current. Lifelong learning won't be optional; it will be essential.

The economy you inherit will be more global and more competitive than ever. Likely, power will continue to shift toward Asia, with the United States, China, and India standing as the world's three largest economies. Sustainability — of energy, food, water and our planet itself — will be both the greatest challenge and the greatest opportunity. And it will be the responsibility of the citisens and leaders from these three countries to show us the way. I have no doubt that you will be one of those leaders.

To meet these challenges, you'll need to collaborate across borders, beliefs and languages. The world will ask you to be not just strong national citizens, but wise global ones and leaders who understand that progress comes from cooperation.

Graduates, innovation is about more than invention — it's about impact. It's about solving real problems for real people. Whether you pursue science, entrepreneurship, research, art or public service, remember that innovation without purpose is empty.

Let me tell you the story of a remarkable man who I met just last year. Today he is the richest Indian in the United States, but he grew up in a small village in the foothills of the Himalayas.

Jay Chaudhry was born on a modest farm, and he went to an even more modest village school. He had the good fortune of having a principal at that school who saw his potential early and focused on his development. This personal investment would lead Jay to the Indian Institute of Technology (BHUIIT), where he attended and graduated, then applied to study at the University of Cincinnati.

Jay earned a full scholarship to study advanced degrees in engineering at UC, but he did not have the travel money. Thanks to a grant to cover his flight, he made the trip and ultimately earned three degrees — two in engineering and one in management, where he met his wife and lifelong business partner, Jyoti, who was working on her business degree.

After graduating in the early ’80s, Jay took a job with IBM as an engineer and did a fair amount of sales work. Importantly, he recognised a critical need facing corporations of the time. Computer security was hindering these businesses from doing their work effectively, and he saw an opportunity to solve that problem by building firewalls. Jay’s ambition was not to be a successful entrepreneur. It was to solve a problem.

He and his wife would put all their savings together and launch a two-person company with Jay running the technical and sales portion and Jyoti running all the other business aspects.

Fast forward to today. Together, they have founded five successful companies, and Jay now serves as CEO of the world’s largest cloud security platform, Zscaler. Though their company is valued at more than $17 billion, I have never met a more humble couple. Their purpose and goal in life have never been simply to get rich, but to make the lives of others better. They live this out through their philanthropy and their commitment to giving back.

Just last year, the Chaudhrys funded the education of more than 150 first-generation students on our campus. They have also established a school and mobile medical infrastructure in the village where Jay was born — a lasting reminder that true success is measured not by what we gain, but by what we give.

**And that Brings Me Back to You**

Students, as you look toward your next chapter, I encourage you to follow the Chaudhrys’ example. My challenge to you is to move forward from today — now fully equipped with the knowledge and experiences you’ve attained — with a renewed sense of purpose.

Charge after your goals, but do not go alone. Go with others. Learn from them. Experience your life and your relationships to the fullest.

And perhaps most importantly, do not forget to bring along your distinctly human self — the same one who has carried you to this very moment.

Your future awaits. *Be Awesome. Be Human. Be You.*

Class of 2025, congratulations! ❑

# CAMPUS NEWS

## Annual Conference of the Indian Economic Association

A two-day Annual Conference of the Indian Economic Association (EIA) was jointly organised by the Department of Economics, Osmania University, Hyderabad and the Institute of Public Enterprise, Hyderabad from December 21-23, 2025. The event aimed to provide an academic platform for critical discussion, evidence-based analysis, and policy-oriented dialogue on key economic issues. The major themes of the event were: *Viksit Bharat* @ 2047: Projecting Headway to a Developed Nation, Structural Changes and Modernisation of the Indian Economy, Tariff War and a New Era of Global Trade, Indian Knowledge Systems: Beyond the Text, and Economy of Telangana.

Prof. B Sudhakar Reddy, Local Organising Secretary and Honorary Director, ICSSR–SRC and Prof. S Sreenivasa Murthy, Director, Institute of Public Enterprise (IPE), Hyderabad, welcomed the gathering. Prof. Dhulasi Birundha Varadarajan, President, Indian Economic Association highlighted the commitment to nurturing research scholars and strengthening the ecosystem of economic research in India by the association. Besides, Prof. D K Madaan, Secretary, IEA introduced the multidimensional functioning of the Indian Economic Association-highlighting its long academic legacy and role in promoting economic research and policy modelling in India.

The Inaugural Address was delivered by Shri N K Singh, Chairman of the 15th Finance Commission and President of the Institute of Economic Growth, New Delhi. In his address, he elaborated on the socio-economic journey of India's priorities from the historical period. He endorsed that international trade is the major source of economic growth and this is very transparent from the achievement of the Asian tigers. He emphasised that the perceived trade-off between democracy and development is a false dichotomy. He observed that India's early concerns regarding external dominance and its inward-looking protectionist policies led to missed opportunities during the initial phase of globalisation, whereas China effectively leveraged the global integration to accelerate its growth. Referring to the reform momentum initiated during the early 2000s—particularly in sectors such as information technology, transport, and infrastructure—he stressed that achieving the vision of *Viksit Bharat* requires sustained reforms and renewed developmental efforts. He cautioned about the rising debt burden of State governments and underscored the need for recalibrated macroeconomic policies. He also emphasised the importance of expanding manufacturing employment and accelerating technological development, highlighting India as a global example of the coexistence of human freedom and economic growth. He concluded by emphasising that successful policy implementation requires the participation of all stakeholders, including governments, markets, institutions, and citizens. Development, he noted, is not a short-term contest but a continuous intergenerational effort, where responsibility and outcomes must be carried forward from year to year and from generation to generation.

Dr. Shamika Ravi, Member, Economic Advisory Council to the Prime Minister, New Delhi delivered the IEA Conference Presidential Address with a focus on new data, new evidence, and narrative economics. She examined trends in poverty reduction, labour market dynamics, and regional growth distribution, using innovative data sources such as satellite imagery and narrative-based economic analysis. Comparing the Tendulkar and Rangarajan poverty lines, she noted that India's poverty rate declined from approximately 29.5 per cent in 2011–12 to around 3.5 per cent in 2024–25, implying that nearly 300 million people have moved out of poverty. She emphasised that the poverty gap for those still below the poverty line is now minimal and argued that targeted policy interventions could help eliminate extreme poverty. Supporting this argument, she pointed out that nearly 40 per cent of households in this category possess some form of motorised vehicle. Addressing labour market structural concerns, Dr. Ravi observed that around 40 per cent of the population is neither employed nor actively seeking employment. She highlighted persistently low female labour force participation, both in rural and urban areas, and raised concerns about declining fertility intentions among young women. In terms of policy recommendations, she

stressed the importance of assigning shadow wages, recognising and strengthening the care economy, covering childcare and elder care and promoting employment, emphasising that job creation is wealth creation. She expressed concern over youth inactivity, noting that individuals with higher education tend to delay workforce entry, while those with lower education levels are more likely to be employed earlier—an emerging structural imbalance in the labour market. Referring to narrative economics, Dr. Ravi highlighted how global narratives often portray India negatively while presenting China more favourably, stressing the influence of geopolitics on economic perception. She encouraged participants to engage with research outputs available on the Economic Advisory Council to the Prime Minister's website.

Prof. Dhananjay Singh, Member Secretary, ICSSR, New Delhi, explained ICSSR's role in advancing the national vision of *Viksit Bharat* @2047. He noted that since its inception, ICSSR has funded nearly 9,600 research projects, of which approximately 2,600 projects were supported in the last two and a half years alone, reflecting a renewed commitment to promoting high-quality social science research. He also emphasised the importance of integrating Indian Knowledge Systems into mainstream academic research.

Prof. Kumar Molugaram, Vice Chancellor, Osmania University, highlighted the crucial role of education and economics in realising the vision of *Viksit Bharat*. He reiterated Osmania University's strong commitment to research and development and its active participation in nation-building through the organisation of national and international academic events.

The P R Brahmananda Memorial Lecture on 'Economic Policy Framework for *Viksit Bharat'* was delivered by Shri Ajay Seth, Chairman, Insurance Regulatory and Development Authority of India (IRDAI) and former Finance Secretary, Government of India. The session was chaired by Prof. T Tirupati Rao, Chancellor, Manipur University, and Former Vice Chancellor, Osmania University, Hyderabad. In his address, Shri Ajay Seth provided a comprehensive policy-oriented framework for achieving the vision of Viksit Bharat, situating India's growth strategy within the broader context of global uncertainty and domestic structural transformation.

The Plenary Session on *Viksit Bharat* @2047 chaired by Prof. Charan Singh opened with a cautionary note regarding the challenges on the path to a '*Viksit Bharat*' (Developed India). Prof. Singh questioned whether India could reclaim its historical status as the 'Golden Bird' of the world. He noted that while India held the world's largest share of wealth before 1100 AD, successive invasions led to economic depletion. At the time of independence, India faced extreme poverty with a 90% illiteracy rate; notably, in the 70 years following, literacy rose to 70%. Prof. Singh emphasised that India's definition of development differs from Western models, as it is rooted in a stable, holistic respect for the ecosystem. He challenged stakeholders to prepare "unit-level blueprints" and annual targets, noting that most organisations currently lack a definitive roadmap for 2047. He warned against complacency, noting that while India aims for high growth, the US and other global powers will also continue to advance. Prof. Vinayak Deshpande, Vice Chancellor, G H Raisoni University highlighted the need to jump from a current per capita income of $2,500 to at least $13,500 by 2047. He stressed the importance of female labor force participation and pointed out the R&D expenditure gap: India spends $50 billion compared to $300 billion by the US and $500 billion by China.

Prof. D K Madaan, Secretary, IEA advocated for increasing purchasing power parity, raising labor force participation, and prioritizing spending on education and health over populist 'freebies'. Prof. P Arunachalam (IIAS, Shimla) discussed the role of government initiatives in fostering long-term growth through institutional reforms and inclusive development.

Plenary Session on 'Tariff War and a New Era of Global Trade' chaired by Prof. V N Attri examined global protectionism and India's strategic positioning. He emphasised the inseparable link between economic theory and policy, warning that modern policymaking often neglects theoretical foundations and empirical evidence. It highlighted global institutions like the United Nations and the World Bank, stressing data-driven, knowledge-based development. Drawing on classical trade theories of Adam Smith and David Ricardo, Prof. Attri explained why nations trade to enhance global welfare. References to Paul Samuelson and later empirical work underline the evolution of trade theory towards integrating rigorous evidence with theory to explain modern trade patterns.

Dr. C. Muthuraja analysed the erosion of the WTO-led order and the rise of fragmented supply chains. Using a SWOT framework, he outlined how India can turn protectionist trends into opportunities through domestic capacity building and technological innovation.

Dr. D R Agarwal highlighted widening global inequality, noting that a small share of the population controls a disproportionate share of income and wealth under contemporary capitalism and consumerism. Despite a massive global GDP, excessive consumption has led to the depletion of natural resources, threatening sustainability. Dr. Agarwal stresses the urgency of achieving net-zero emissions by 2050 through alternative and green technologies. Beyond economic and technological solutions, the speech argues for restoring ethical values such as dharma, cultural integrity, and human-centred principles. For India, long-term solutions to growth, unemployment, and poverty lie in a balanced economic system rooted in human values and sustainable development.

During the plenary session on 'Structural Changes and Modernization of the Indian Economy', Prof. R K Mishra compared India's modernisation trajectory with China and South Korea to provide policy direction. Prof. Surendera Kumar argued that resources are not scarce but require reallocation from low-productivity to high-productivity sectors, integrated with digital connectivity and climate consciousness. Dr. S.K. Mahabatra addressed climate finance (COPs 27–30), advocating for "Development-Linked Climate Finance." Dr. Gobinath focused on rural transformation, emphasizing the need for 'data normalisation' at the panchayat level to bridge agricultural yield gaps and Vaishali Malhotra discussed the digital transformation of tax administration, noting that GST implementation has smoothed despite challenges for MSMEs.

Plenary Session on 'Indian Knowledge Systems (IKS): Beyond the Text' was chaired by Prof. N K Thanuja. He explored the economic theories embedded in the Shastras and Vedas. Prof. Rajkumar Mittal critiqued the Western model for fostering excessive consumerism. He advocated for IKS-based development that prioritises Dharma (morality) and the environment, categorising IKS into technical expertise and 'soft aspects' like Yoga and Ayurveda. Shri Guntha Laxman highlighted the global recognition of Indian ancient knowledge (e.g., the *Bhagavad Gita* in law schools) and the importance of reviving the *Gurukula* system. Dr. M L Raja presented research asserting that ancient Indian literature dates back over 5,200 years and Dr. T P Sasi Kumar compared the genius of Ramanujan to Einstein and cited the *Bhagavad Gita's* emphasis on the value of labour.

Prof. T Koti Reddy chaired the Plenary Session on 'The Economy of Telangana'. He acknowledged that while Telangana is a young and progressing state, it faces significant hardships and is currently following a specific vision document. Dr M Gopinath Reddy discussed the BRS government's tenure, noting that massive investments in irrigation have yet to translate fully into increased productivity. Prof. Raja Mohan Rao pointed out persisting regional disparities and growing social inequalities. Prof. Krishna Reddy noted that a sharp increase in public debt and expressed concern over the performance of the health and education sectors and Prof. Ravendra Rana summarised the history of the Telangana movement, stating that more concrete efforts are needed to meet the original aspirations of the state's people.

During the valedictory function, the valedictory address was delivered by Shri Sanjaya Baru, Distinguished Fellow, United Service Institution of India and Former Media Advisor to Prime Minister Dr. Manmohan Singh. Prof. V Balakrishna Reddy, Chairman, Telangana State Council of Higher Education, Hyderabad, participated as a distinguished guest, and Prof. G Naresh Reddy, Registrar, Osmania University, attended as a Guest of Honour. Prof. B Sudhakar Reddy, Local Organising Secretary, and Director, ICSSR-SRC, Hyderabad proposed the vote of thanks. Earlier, Prof. Lakshmi Kumari, Dean, Research, Institute of Public Enterprise welcomed the gathering.

## Conference on Information Systems

A three-day Conference on 'Information Systems' is being organised by the Indian Institute of Management Ahmedabad, Gujarat from March 06 - 08, 2026. The scholars, policy researchers, developers, practitioners, community leaders, doctoral students and early-career researchers may participate in the event.

In an era of accelerating digital transformation, Digital Public Infrastructure (DPI) emerged as a foundational layer enabling inclusive and equitable access to digital services. Initiatives such as UPI, PAHAL, DIGIPIN, Aadhaar, ONDC, and CoWIN in

India illustrate the transformative potential of DPI in fostering social equity, economic opportunity, and responsive governance. As governments and societies across the world grapple with questions of data sovereignty, digital rights, and sustainable development, DPI stands as a critical domain at the intersection of society, technology, and policy. However, as DPI scales, it also raises complex challenges related to design and governance towards long-term sustainability, implications of digital sovereignty in an interconnected world, embeddedness of inclusiveness, accountability, transparency, and trust in DPI systems, and the role of IS research in shaping deployment, architecture and impact of DPI.

InCIS 2026 seeks to bring together various stakeholders to explore the design, deployment, governance, and impact of Digital Public Infrastructure and, more broadly, Information Systems. The following are the Theme Tracks of the event.

***Digital Public Infrastructure for a Sustainable and Sovereign Digital Future***

- Conceptual and Empirical Research on DPI.
- Frameworks for Sustainable DPI Development and Governance.
- Socio-technical Analysis of National and International DPI Initiatives.
- DPI and Digital Divide Linkages.
- University, Industry and Government Interactions in DPI.
- Research on Digital Identities, Open Platforms, Data Sovereignty, and Digital Rights.
- Case Studies on DPI Implementations and Public Sector Innovation.
- Intended and Unintended Consequences of DPI.
- Role of Private Sector for DPI Growth and Evolution.
- Gender and DPI.

***Digital Business and Commerce***

- Emerging Business Models in e-commerce (D2C, Social Commerce, Quick Commerce).
- Logistics and Supply Chain Innovations in e-commerce.
- Online Trust and e-commerce.
- Digital Entrepreneurship.
- Innovation and Product Development in Digital Business.

***Collaborative and Social Technologies***

- Online Communities and User-generated Content.
- Collaborative Technologies and Digital Collaboration.
- Sharing Economy and Implications on Market and Society.
- Sharing Economy and Role of Trust.

***Technological Innovation and the Future of Work***

- Remote and Hybrid Work Models: Opportunities and Challenges.
- Rise of Gig Economy.
- Digital Skill Gaps and Workforce Reskilling Practices.
- Human-AI Collaboration and Augmented Intelligence.

***Information Systems Research for Social Good***

- Evaluating IS Contributions to Sustainable Development Goals (SDGs).
- IT Adoption and Digital Transformation in the Global South.
- Grassroots and Community-driven Digital Innovation.
- IS Interventions in Education, Health, Gender Equity, and Rural Development.

***Governance in Smart and Connected Environments***

- IoT, Smart Cities, Services, and Governance.
- Data Governance and Ethical Use of Citizen Data.
- Cross-sector collaboration and Platform Governance.
- Performance Evaluation of Smart and Connected Systems.

***Security and Privacy***

- Cybersecurity Threats and Risk Mitigation Strategies.
- Ethical Issues in the Use of Emerging Technologies.

- Impact of AI and Automation on Privacy.
- Information Security Management in Organisations.

***Information Systems Design, Development and Project Management***

- IS Design, Development, and Project Management.
- Digital Transformation of IS Project Management.
- The role of AI in developing Information Systems.
- Sustainability in IS Project Management.

***Inclusion, Diversity, and Sustainability through IS***

- Impact of Digital Technologies to Achieve SDGs.
- IS for a Sustainable Future.
- Governing Digital Investments from a Sustainability Perspective.
- Green Information Systems.

***Artificial Intelligence and Analytics***

- Adoption, user Experience and Impacts of Analytics and Artificial Intelligence.
- Governance And Ethics of Artificial Intelligence, Especially Generative Artificial Intelligence.
- Theory Building Using Machine Learning and Artificial Intelligence Methods.
- Dark Side of Adopting Artificial Intelligence in Organisations and Society
- Bright Side of Designing AI Artifacts for a Brighter Society.

***Human Technology Interaction***

- Psychological, Social, and Cultural Aspects of Human-Technology Interactions
- The Role and Impact of Gamification in Human-Technology Interactions
- Platform Design to Elicit User Interactions.
- Design and Impact of Wearable Technologies.

***Practitioners Track***

- Advancing High-quality Practitioner-oriented IS Research and thought Leadership
- Promoting Action Research as a Vital Resource for Digital Leaders.
- Providing a Platform for Discussing How Current IS Challenges Can Generate Valuable Insights and Guide Future Research.
- Exploring Digital Transformation Journeys in Indian Organisations Backed by Rigorous Empirical Evidence

***Next Generation Information Systems***

- Strategic Adoption and Organisational Impact of Next-generation IS.
- Cloud, Quantum, Edge, and Platform-based Systems for Digital Transformation
- Blockchain, Decentralised Ledger, Financial Technologies (Fintech) and Emerging Business Models.
- Transformative Impact of Immersive Technologies.

***General IS Topics***

- Any Other General IS Topics.

For further details, Contact Organising Secretary, Centre for Digital Transformation, Indian Institute of Management Ahmedabad, Gujarat. E-mail: *incis2026@iima.ac.in.* For updates, log on to: *https://conference.iima.ac.in/incis2026*

## National Conference on Sustainable Development

A two-day National Conference 'Gramodaya' on the theme 'Sustainable Development in Rural India: Policy Roadmap for *Viksit Bharat* 2047' is being organised by the School of Rural Development, Tata Institute of Social Sciences, Tuljapur Campus, Tuljapur from March 05-06, 2026. The aim of the event is to extend the discussions towards sustainable rural development, considering the challenges we are facing today due to a shift in climatic conditions, and explore the opportunities for a sustainable future.

Rural India is home to over 65% of its population and it plays a critical role in the country's socio-economic development. While urbanisation continues to grow, rural India remains the backbone of agricultural productivity, biodiversity, and cultural heritage. Though rural India faces persistent challenges such as poverty, lack of infrastructure, unemployment, inequitable access to quality healthcare and education, sustainability is often ignored in the development discourses for rural India. A strong approach towards sustainable rural development

is not only important for national progress, but it also aligns with a country's global commitments such as the UN Sustainable Development Goals 2030. These commitments necessitate an integrated approach which combines economic development, social inclusion, and environmental sustainability, with active participation from local communities, policymakers, civil society, and international stakeholders. The Subthemes of the event are:

***Sustainable Agriculture and Rural Economy***

- Agroecology and Organic Farming.
- Water-efficient Irrigation Methods.
- Agri-value Chains and Market Access for Farmers.

***Renewable Energy and Clean Technologies***

- Solar and Biomass Energy Solutions for Rural Areas.
- Decentralised Energy Grids.
- Clean Cooking Technologies.

***Education, Skills, and Youth Empowerment***

- Rural Digital Education Models.
- Vocational Training and Entrepreneurship for Rural Youth.
- Gender Inclusion in Education and livelihoods.

***Rural Healthcare and Sanitation***

- Rural Primary Healthcare Infrastructure.
- Telemedicine and Health-tech for Underserved Areas.
- Water, Sanitation, and Hygiene (WASH) Initiatives in India.

***Climate Resilience and Natural Resource Management***

- Community-led Forest and Watershed Management.
- Climate-resilient Crops and Livelihoods.
- Disaster Preparedness and Early Warning Systems.

***Social Inclusion and Participatory Governance***

- Empowering Women and Inclusive Governance.
- Panchayati Raj Institutions in Sustainable Rural Development.
- Transparency, Accountability, and Citizen Participation.

***Technology and Digital Transformation in Rural Development***

- Role of ICT in Rural Planning and Service Delivery.
- E-Governance and Digital Financial Inclusion.
- Data-driven Decision-making, Digital Democracy.

For further details, contact Convener, Prof. Bal Rakshase, Campus Director, Tata Institute of Social Sciences, Tuljapur, Osmanabad, Maharashtra, E-mail: *gramodaya@tiss.ac.in.* For updates, log on to: *www.tiss.ac.in/events/*

## International Seminar on Shaping Tomorrow

A two-day International Seminar on 'Shaping Tomorrow: Education, Skill and Youth Empowerment for a Better Society' is being organised by the Department of Education, Kumar Bhaskar Varma Sanskrit (KBVS) and Ancient Studies University (ASU), Nalbari, Assam in collaboration with IQAC, KBVS & ASU, Skill Development Centre, KBVS & ASU and Assam Skill Development Mission from March 26-27, 2026 through hybride mode. The event is sponsored by the Indian Council of Social Science Research (ICSSR).

Education is the only powerful weapon which can bring transformative changes in society by shaping young minds. In today's rapidly changing world, it is not just academic knowledge but also practical skills and critical thinking that determine success. Empowering young people through quality education and relevant skills equips them to face challenges and contribute to national development. Education bridges the gap between learning and employability through skill development. The NEP-2020 has highlighted the importance of introducing skill education in earlier grades. Exposure to skill education will increase the employability of the youth, leading to a progressive society. The cherished vision of *Viksit Bharat* 2047, as envisioned by the Govt of India, cannot be achieved without your empowerment. By investing in skill development, we are investing in empowering young people to lead innovations, focusing on sustainability for shaping the future in a better way.

- Digital Literacy and Technology Integration in Education.
- Ethics and Values for a Better Future.

- Skill Education in Rural Context.
- Soft Skills for Career Success: Communication, Leadership & Collaboration.
- Creativity, Critical Thinking, and Problem-Solving Skills for a Better Future. for Better Future.
- Lifelong Learning and Continuous Skill Development.
- Role of Skill Education for Youth Empowerment
- Mental Health Awareness and Psychological Well-being of Youth.
- Building Leadership Capacity among Youth.
- Empowering Women through Education and Skills.
- Education and Skill for Sustainable Societies.
- Green Skills for a Better Society.
- 21st-century Skills for Youth.
- Role of Artificial Intelligence in Skill-based Education.
- Role of NGOs and International Organizations in Youth Empowerment.
- Policy Reforms for Youth Development.
- Policy Reforms for Skill Development.
- Skill Development in NEP- 2020.
- Innovations in Skill Education.
- Skill Development and Employability.
- Skill Education for Divyangjan.
- Skilling in the Age of Multiculturalism.
- Inclusive and Equitable Education.
- Any Topic Related to the Main Theme.

For further details, contact Organising Secretary, Dr. Nabanita Sarmah, Director, IQAC, Kumar Bhaskar Varma Sanskrit and Ancient Studies University, Nalbari, Assam. Mobile No: 69001100 43/7002378852/9435981054. E-mail: *intseminar.kbvsasu2026@gmail.com*. For updates, log on to: *www.kbvsasun.ac.in/events/*. ❑

# Book Review

# A Comprehensive Resource for Younger Generations

**Sudhir Singh***

**Rajput, J. S. (2025).** ***Education for a New World Order,*** **Vitasta Publishing Pvt Ltd., New Delhi, PP 178, Rs 495/-**

In the last decade of the 20th century, the human species was getting ready to welcome the advent of the third millennium, there were whispers that the only prediction that could be made with confidence was that the next century could be the 'century of the unpredictable pace of change'! That has proved right. The first quarter of the 21st century is over. It has ushered in an unbelievable series of changes at this juncture of history at an unprecedented pace. In the sector of education, newer opportunities are opening up, major policy changes have become necessary to keep pace with the new aspirations of the 'Young; the Millennials'. Simultaneously, the teachers, academics and researchers have so much to study, investigate and incorporate. We are getting a considerable number of books that deal with the advent of the AI, and the related possibilities, potential for the future, and the apprehensions. The book under review succinctly deals with the background and the growth and development in education, right from universalising education, to the initiatives for achieving excellence in higher education and research, and its preparedness to synchronise itself with the process of integrating the emerging aspirations.

The 'Ray of Hope' particularly for the developing countries, was education. It was resolved by the global community in Jomtien, Thailand, in March 1990 that illiteracy would be totally vanished by the next decade. It helped, but the estimated global literacy rate is around 88% only. Those outside its pale would require far more initiatives and efforts to be brought in. But education, its acceptance, relevance, and quality are not the only challenges before the governments and the people; they have before them the concerns that challenge he very existence of life on earth. It is no more the concern of development alone; it is its disastrous consequences that have acquired a horrifying presence that could wipe out the very presence of humanity. Even during these unusually tough times before the global community, education still remains the necessary utopia, and humankind sees in education an indispensable asset in its attempt to attain the ideals of peace, freedom and social justice.' As the most potent weapon to 'reduce poverty, exclusion, ignorance, oppression and war', education and education policies deserve persistent attention to envision the future ad, prepare humanity for the future. In these times, a book on "education for a new world order" from a well-known Indian educationist is most welcome. The author has behind him multi-disciplinary and multifarious experiences, extending over six decades. It obviously gives strength to this critique and the inferences that are drawn after an incisive analysis.

It emerges very prominently before the reader that, despite a huge upsurge in the creation, generation and utilisation of new knowledge and skills, the sense of achievement and bliss has certainly deteriorated. The list of great achievements and advances could be considerably extensive, a credit to education and brilliant and skilful human beings. The universalising of connectivity says it all! The other side, the breakage of the sensitive bond between the man and nature, is succinctly brought about by the author in the chapter 'Global Educational Scenario and Emerging Trends. The challenges before education were very clearly and comprehensively identified by the Delores Commission, appointed by UNESCO to prepare a Report on Education in the 21st Century, in terms of seven tensions that have germinated in full force before humanity. These tensions are between: global

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and local, universal and individual, traditional and modern, long-term and short-term considerations, need for competition and concern for opportunity, extraordinary expansion of knowledge and the human being's capacity to assimilate, and the tension between spiritual and modern. All this rise of distrust, fanaticism, terrorism, violence, wars, and huge expenditures on research and production of weapons are just a consequence of tensions that have made human beings conscious of the danger being posed to the very existence of life! Education; the right education, alone could offer solace and solutions. It must transform itself to offer the learner not only information and knowledge, but skills of questioning, incisive critical analysis, inferring, analysing and readiness o innovate. In short, Education must prepare individuals have the wisdom to envision a bigger and wider horizons that extends from individuality to universality. The challenge before education must be seen in the Preamble of the UNESCO: "since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed." Unfortunately, the UN could not come up to the global expectation of creating a peaceful world during its existence of eight decades. It must be conceded that it has a reasonably good list of achievements, particularly in the field of education and literacy.

In the Indian context, the issues, achievements, impediments, limitations, and demands are normally well-known. India has its diversity, of every possible kind, including linguistic, cultural and that of belief and faith. It has its poverty and paucity of resources to bring about equality of opportunity t the masses in every sense. This book recalls the words of Swami Vivekananda on education: "Education which does not help the common mass of people to equip themselves for the struggle for life, which does not bring our strength and character, a spirit of philanthropy, and the courage of a lion - is it worth the name? Real education is that which enables one to stand on one's own leges." As these words were articulated over 125 years ago, one could rightly ask how relevant these in the current and future context? The book answers this in a very subtle manner. Rabindranath Tagore once told French author and intellectual Romain Rolland, "If you want to know India, stay in Vivekananda. In him everything is positive and nothing negative."

The challenges be for the Indian education system, completely immersed in implementing he NEP–2020 emerge very clearly in this book. The issues highlighted clearly indicate the presence of the in-depth familiarity of the author with the scenario, its strengths and weakness. It essentially opens up encouraging avenues in the pursuit of excellence in the nation's march towards a knowledge society. ❑

# COMMUNICATION

## Commentry: *Viksit Bharat Shiksha Adhishthan* Bill 2025

**H A Ranganath***

National Education Policy 2020 (NEP 2020) was approved by the Union Cabinet on 29 July 2020. This was followed by a wave of hype on NEP 2020 with repetitive ideas in narratives and articles praising the contributions of the Committee and seminars, workshops etc were organised across the country. But there were no attempts to initiate strategies to implement the recommendations. Of course, attempts were made/are being made to translate a few of the recommendations in bits and pieces by the regulators and also a few HEIs. In a way, the climate was free for all types of interpretations of the NEP–2020. To implement the recommendations of NEP–2020 structural changes in the existing bureaucratic set up were needed. With the introduction of the Bill in the parliament, a breakthrough has been achieved. Let us not give scope and space for yet another wave of hype reacting and appreciating the Bill. The need of the hour is actions to take forward the reforms with suitable regulations.

The bill has created a provision to establish an overarching body namely VIKSIT BHARAT SHIKSHA ADHISHTHAN, (VBSA). Also, to establish three councils under VBSA. They are Viksit Bharat Shiksha Viniyaman Parishad (Regulatory Council), VIKSIT BHARAT SHIKSHA GUNVATTA PARISHAD (Accreditation Council) and VIKSIT BHARAT SHIKSHA MANAK PARISHAD (Standards Council). In the entire Bill, the new nomenclature is seen only as the title at the beginning para of each council and nowhere else! May be too complicated. The functions of each player of this new architecture depend on the decisions arrived at by other bodies. In a way one body guides and lead the other to take forward the process. This is an interdependent cluster of 4 organs. The Regulations to be framed for each clause of these bodies have to take care of this organic link for smooth hassle-free implementation of reforms. It is better to have a representative from Civil Society as a Member in all committees – ADHISHTHAN, and three Councils. The breakthrough must be sustained if not breakdown follows.

The cluster represents a highly centralised authority of higher education. Such highly centralised governance has both advantages and drawbacks. The system must be receptive and evolve through research, consultation, feedback from stake holders etc. The cluster is expected to address and take care of the wellbeing of higher education which is evolving globally.

*On Page 27 of the Bill the statement is "The Bill further provides for repealing the University Grants Commission Act, 1956, the All India Council for Technical Education Act, 1987 and the National Council for Teacher Education Act, 1993".*

What does it mean? It is not clear. For instance, UGC/AICTE/NCTE are multifunctional bodies. Will VBSA takes over all the functions of these repealed bodies and distribute them among three councils, namely Regulatory Council, Accreditation Council and Standard Council?

The NEP 2020 recommended 4 pillars including an important pillar namely Higher Education Grants Council (HEGC). But it is missing under the umbrella of VBSA. Who will be entrusted with this responsibility? Ministry? other Council ? which is not a part of VBSA. This is not a healthy development. Funds and graded autonomy etc for HEIs usually depends on the performance, projects, accreditation and many of these decisions are with VBSA and three councils. Government has established another portal for provide funds under different schemes for research in HEIs, that is Anusandhan National Research Foundation (ANRF). Confusion prevails and needs clarifications.

All HEIs (60000+) namely Central universities (57), State universities (504), Private universities (512), Deem to be Universities (145), Colleges (46,624), standalone institutions (12543), institutions of national importance (146) are brought under

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VBSA, an extreme case of centralization. *This is not as per the recommendations of NEP 2020.*

As the numbers of HEIs in the country indicate, the backbone of our HE ecosystem is State universities and its affiliated colleges. With UGC's recognition, these institutions are mentored and managed by the respective state governments. If VBSA takes over these institutions, does it mean it is only for regulation related issues or will it also include funding etc., also? What will be the role of States? Will it not rake up controversy between the state and central governments in the name of federal system/concurrent subject? The conflicts will only harm the students enrolled in state universities.

Many foreign universities are opening campuses to offer courses, programmes and to confer degrees/ diplomas from parent institutions. It is better to bring in such campuses under the purview of VBSA.

While articulating provisions in the form of regulations, the centralised system must take cognizance of diversity prevailing in our country, of institutions, rural-urban divide, cultural and philosophical divide, language issues, etc., and should avoid one-size-fit-all proposals.

Finally, I am reminded of Charles Darwin's statement, that is, "To kill an error is as good a service as, and sometimes even better than, the establishing of a new truth or fact." A word of caution!. ❑

# THESES OF THE MONTH

## HUMANITIES

**A List of doctoral theses accepted by Indian Universities**
**(Notifications received in AIU during the month of March-April, 2025)**

### Geography

1. Dave, Viranch Narendra. **Site suitability evaluation for ecotourism development using hybrid multi criteria decision making and geospatial techniques in Banswara District, Rajasthan**. (Dr. Mudit D Mankad), Department of Geography, Maharaja Sayajirao University of Baroda,Vadodara.
2. Debnath, Pradip. **Impact of national highways upon regional development of Tripura: A geographical appraisal**. (Dr. Saptarshi Mitra), Department of Geography & Disaster Management, Tripura University, Suryamaninagar.
3. Singh, Aditya. **Bhumi kee utpadkata evam krishi vikas ka tulnatamak bhogolik adhyayan: Sultanpur (U.P.) Jile ke vishesh sandarbh mein**. (Dr. Chandra Mohan Rajoriya), Department of Geography, Bhagwant University, Ajmer.
4. Sonia. **Study of urban planning in Rohtak District with special reference of renewable resources**. (Dr. L C Verma and Dr. Nagendra Kumar Sharma), Department of Geography, Bhagwant University, Ajmer.
5. Tiwari, Mayank. **Nagariye evam paryatan vikas ka bhu-rajnitik adhyayan: Ayodhya (Faizabad) Jile ke vishesh sandarbh mein**. (Dr. Chandra Mohan Rajoriya), Department of Geography, Bhagwant University, Ajmer.
6. Ugra, Mohan Das. **Krishi tatha arthik vikas ka istar evam sambhavyata: Banka Jila (Bihar) ke sandarbh mein bhogolik vishleshan**. (Dr. Darogi Das and Dr. Sharat Chandra), Department of Geography, T M Bhagalpur University, Bhagalpur.

### History

1. Sen, Govind. **Aupniveshik kal mein Ajmer-Merwara mein Arye Samaj ka Jan chetna ke puney jagran mein yogdan 1871 isvi se 1947 isvi tak**. (Dr. Dinesh Mandot), Department of History, Bhagwant University, Ajmer.
2. Singh, Garima. **The cuisine traditions of Gujarat: Past to present**. (Prof. Vibhuti Parikh), Department of History, Maharaja Sayajirao University of Baroda,Vadodara.

## LANGUAGES & LITERATURE

### English

1. Acharjee, Debasish. **The pedagogy of select soft skills in English literature as a means of learner empowerment**. (Prof. Somdev Banik), Department of English, Tripura University, Suryamaninagar.
2. Ali, Fatima Abdul-Azeez. **Effectiveness of smart devices on improving speaking skills of EFL Yemeni students**. (Dr. Avinash T), Department of English, Kuvempu University, Shankaraghatta.
3. Ghatak, Sudeshna. **Examining metaphysics of space and magical feminism: A study of selected fictions by Aimee Bender, Shubhangi Swarup, Bina Shah, Mohammed Hanif, and Naomi Alderman**. (Dr Yashashwini M), Department of English, Jain (Deemed-to-be University), Bangalore.
4. Hassoon, Sufyan Awad. **The concept of Slavery: A comparative study of Ward Badr Al-Salem's novels "The Virgin of Sinjar", "Lalish Daughters" and Alice Walker's novels "The Color Purple", "Meridian" and "Possessing the Secret of Joy**. (Dr. Pulin Bhatt), Department of English, Gujarat University, Ahmedabad.
5. Komal. **Gender and identity: A critical study of select dalit women writings**. (Dr. Bijender Singh), Department of English, Indira Gandhi University, Meerpur.
6. Lalita, K M. **A post-truth analysis of Indian farmers' suicides: A study of selected works by Kota Neelima**. (Dr K Charles Godwin), Department of English, Jain (Deemed-to-be University), Bangalore.
7. Nair, Vinita. **The dialogic playground of interactive fiction: An analysis of Mikhail Bakhtin's theories and polyphony and dialogism in select modes of interactive fiction**. (Dr. Mekhala Venkatesh), Department of English, Jain (Deemed-to-be University), Bangalore.
8. Puyed, Madhav Bhujangrao. **New historicism in the select novels of Nayantara Sahgal**. (Dr. Masure J S), Department of English, Swami Ramanand Teerth Marathwada University, Nanded.

9. Rachna. **Manifestations of Indian sensibility: A socio cultural study of Amit Chaudhuri's novels**. (Dr. Vikram Singh), Department of English, Kurukshetra University, Kurukshetra.

10. Radhika Ramesh. **A select study of contemporary digital literature**. (Dr. Mekhala Venkatesh), Department of English, Jain (Deemed-to-be University), Bangalore.

11. Rajpurohit, Kaushalya G. **A cultural study of Rajasthani folk songs in colonial and postcolonial contexts**. (Prof. Neeti Singh), Department of English, Maharaja Sayajirao University of Baroda,Vadodara.

12. Roopa Rani, G S. **Reiterating violence against women: A study of selected 21st century Indian memoirs and graphic novels**. (Dr. K Charles Godwin), Department of English, Jain (Deemed-to-be University), Bangalore.

13. Sadiq, Mohammed Jaffer. **Decoding Masculinities: Treatment of contemporaneity in Select South Asian texts**. (Dr. Trivedi Nikunj P and Dr. Mekhala Venkatesh), Department of English, Jain (Deemed-to-be University), Bangalore.

14. Sharma, Aditi. **Discoursing myth and gender through the archetype of Radha, Kali and Draupadi with special reference to the Gita Govinda, the Devi Bhagavatam and the Mahabharata**. (Prof. Neeti Singh), Department of English, Maharaja Sayajirao University of Baroda, Vadodara.

15. Sharma, Garima. **Meaning of self: A study of the select works of Albert Camus**. (Dr. Ravindra Kumar), Department of English, Chaudhary Charan Singh University, Meerut.

16. Shet, Raghavendra A. **Contextualising modernity in the select dalit writings of South India**. (Dr. Avunash T), Department of English, Kuvempu University, Shankaraghatta.

17. Singh, Reshma. **Subalternity in the creative writings of Mahasweta Devi and Arundhati Roy: A critical study**. (Dr. Pratyush Kaushik), Department of English, Chanakya National Law University, Patna.

18. Sushma, V. **Teaching second language to children with Special Educational Needs (SEN): A study conducted in Bangalore Secondary Sen Schools**. (Dr. K Charles Godwin), Department of English, Jain (Deemed-to-be University), Bangalore.

19. Tabassum. **Interrogating gender stereotypes: A study of selected young adult fiction by Indian women writern in English**. (Dr. Ramaprasad B V), Department of English, Kuvempu University, Shankaraghatta.

20. Yadav, Pinki. **Women as agency of change: A study of select novels of Preeti Shenoy**. (Dr. Anupama Chauhan), Department of English, Kurukshetra University, Kurukshetra.

**Hindi**

1. Neeru Rani. **Gyan Prakash Vivek ke sahitye mein aadhunik yugbodh**. (Dr. Kamraj Sindhu), Department of Hindi, Kurukshetra University, Kurukshetra.

2. Patel, Kaushal Kumar. **Hindi Anchal ke grameen yatharth ka badaltaa swaroop: Renu evam Shivamurthi ke katha sahithya ka thulanathmak pariprekshya**. (Dr. Sreenivasaiah R), Department of Hindi, Jain (Deemed-to-be University), Bangalore.

3. Poonam Kumari. **Ikkiseveen sadi ka Hindi Mahila Yatra Sahitya: Vishleshan aur mulyankan**. (Prof. Sushil Kumar Sharma), Department of Hindi, Mizoram University, Aizawl.

4. Renu. **Vinod Kumar Shukal ke katha sahitya ka samajshastriya adhyayan**. (Dr. Sukarmwati Devi), Department of Hindi, Kurukshetra University, Kurukshetra.

5. Shetty, Suresh Tandurajan. **Suryabala tatha Akhilesh kee chayenit kahaniyoan mein nihit samasyaoan ka tulnatamak adhyayan**. (Dr. Smita C Patel), Department of Hindi, Saurashtra University, Rajkot.

6. Sushma Rani. **Haryanvi Swango ka satree-drishti se aalochnatamak adhyayan**. (Dr. Hariom Fuliya), Department of Hindi, Kurukshetra University, Kurukshetra.

7. Verma, Madhuri. **Gulzar aur unka rachna sansar**. (Dr. Nawal Kishore Bhabhra), Department of Hindi, Bhagwant University, Ajmer.

**Sanskrit**

1. Alka.**Vedantsarvedantshiddhantmuktavali-granthyohstulnatmakamadhyayanam**. (Prof. Prabhakar Prasad), Department of Sarva Darshan, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

2. Behera, Pratyus Kumar. **Śabdaśaktiprakāśikāyām samāgatanam siddhäntänam samikşanam**. (Prof. Ganapati Shukla), Department of Darshana, Central Sanskrit University, New Delhi.

3. Bhattacharya, Gautam. **A critical study on Durgotsavatattva, a part of Tithitattva of Astavimsatitattva of Raghunandana Bhattacharya**. (Prof. Brundaban Dash), Department of Paurohitya, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

4. Chaturvedi, Ashish Kumar. **Śrīmadvalmīkīyarāmāyaṇasya upajīvyatve kāvyaśāstrīyapariprekkye pañcamahākīvyānām tulanātmakamadhyayanam**. (Prof. Janardan Prasad Pandey), Department of Sahitya, Central Sanskrit University, New Delhi.

5. Jena, Rajshree. **Madhavakavipranītasya Vīrabhanūdayakāvyasya samīkśatmakam sampādanam**. (Prof.Udaynath Jha), Department of Sahitya, Central Sanskrit University, New Delhi.

6. Mangal, Manju. **Brahmvaivartpurane prakritishaktinirupnam**. (Prof. Shitla Prasad Shukla), Department of Puranetihas, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

7. Mishra, Satyawrat. **Mahabhasya-Kashika-VaiyakaranaSiddhantakaumudishu Sandhi-Samasa-Karaka Sambddhaanaam udayanaanam sanskritikmadhyanam**. (Prof. Vishnukant Pandey), Department of Vyakarna, Central Sanskrit University, New Delhi.

8. Nayak, Laxmipriya. **Satīkasya Laksmīskvaracaritasya samīksātmakam sampadanam**. (Prof. Udaynath Jha), Department of Sahitya, Central Sanskrit University, New Delhi.

9. Neeraj Kumar. **Pramukhaprakritkathagrantheshu varnitayah loksanskruteh sampratikam prasangikatvanch**. (Prof. Kalpana Jain), Department of Prakrit, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

10. Pant, Saurabh. **Srimadhusudansaraswatinamvadansamiksanam**. (Prof. Sangeeta Khanna), Department of Sarva Darshan, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

11. Pradhan, Mamata. **Panditpundarikakshyamishravirachitasya Bhadrarjuniyamityakhyanatakasya sampadanam samikshyanamcha**. (Prof. Dharmananda Rout), Department of Sahitya, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

12. Ramandeep. **Sanskrita Vangamayasamraksanasamvardhane BīkāneraMaherjanupasim hasyāvadānam tadvishayakalaghukāvyayoh samīkshatmakam sampadanam sahityikānušīlanañca**. (Prof. Vijaypal Shastri), Department of Sahitya, Central Sanskrit University, New Delhi.

13. Shah, Jepal Bijal. **Uttarajjhayanani (Uttaradhyaan Sutra) and Bhagavad Gita: A comparative study**. (Dr. Dinanath Sharma and Dr. Prakash Pandey), Department of Prakrit, Gujarat University, Ahmedabad.

14. Sharma, Giriraj. **Jyotişaśastrasya vibhinnāsiddhantānām pārasparikabheda vimarśah**. (Prof. Vasudeva Sharma), Department of Jyotish, Central Sanskrit University, New Delhi.

15. Sharma, Megha. **Nagara Vesar Dravida Devaprasadanam Jyotisavastusastrayoh drstya prayogikamanusilanam**. (Prof. Bihari Lal Sharma), Department of Phalit Jyotisha, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

16. Sharma, Shivani. **Bhasasastradrsa Mimamsasastriyanyayanam Upadeyatvam**. (Prof. Satyam Kumari), Department of Darshana, Central Sanskrit University, New Delhi.

**Urdu**

1. Abdul Hafiz. **Junoobi Hind ke muntakhab Urdu safarnama nigar**. (Dr. Syed Sanaulla), Department of Urdu, Kuvempu University, Shankaraghatta.

2. Alam, Md Aftab. **Urdu Nasar ke irtequa mein Prof Ahmad Sajjad kee khidmaat ek tanquidee motala**. (Dr. Md Atiqur Rahman), Department of Urdu, T M Bhagalpur University, Bhagalpur.

3. Fatha, Abdul. **Hafiz Karnataki: Zikr Fikr aur Fan**. (Dr. Syed Sanaulla), Department of Urdu, Kuvempu University, Shankaraghatta.

4. Hussain, Layaqat. **Reclaiming the past: A study of select novel of Mustansar Hussain Tarar**. (Dr. Irfan Ahmad Malik), Department of Urdu, University of Kashmir, Srinagar.

## PERFORMING ARTS

**Music**

1. Sharanya, R. **A study of Sankirna Ragas in Karnatak music**. (Dr. Meera Rajaram Pranesh), Department of Music, Jain (Deemed-to-be University), Bangalore.

❑

# JAMSHEDPUR WOMEN'S UNIVERSITY

## जमशेदपुर महिला विश्वविद्यालय

JAMSHEDPUR, JHARKHAND

As notified in the Gazette of Jharkhand extra ordinary No.-127, Chapter-02, Section-3 Dated 15/02/2019

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- Skill-based learning
- Problem-solving & innovation
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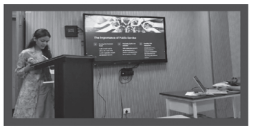




# Hemchand Yadav Vishwavidyalaya, Durg

**Raipur Naka, Durg, Chhattisgarh 491001- 491001**

**Advt.No. 16/Estt./HYV/2026** **Durg, Dated 19-01-2026**

## Advertisement

Hemchand Yadav Vishwavidyalaya, Durg invites applications for the position of **Chair Professor for the Research** Chair in Indian Knowledge System and Philosophy, Research Chair in Tribal Studies and Tribal Culture, Research Chair in Sustainable Development and Environmental Studies, Research Chair in Artificial Intelligence and Data Science and Research Chair in Pandit Deendayal Upadhyaya Studies. Advertisement related information is available on the university **website: https://www.durguniversity.ac.in.** The last date for application is 09/02/2026. Ensure to send the hard copy of the application to the Registrar, Hemchand Yadav Vishwavidyalaya, Durg (CG), Raipur Naka/Potiyakala, Durg, Chhattisgarh 491001.

Sd/-
**Registrar**

# Hemchand Yadav Vishwavidyalaya, Durg

**Raipur Naka, Durg, Chhattisgarh 491001- 491001**

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Hemchand Yadav Vishwavidyalaya, Durg invites applications from eminent and experienced experts from industry, research and academic institutions for the **post of Professor of Practice** in the areas of (i) Entrepreneurship / Incubation / Startup (ii) Product Design & Smart Manufacturing, (iii) Energy / Renewable Energy / Power Sector, (iv) Inclusive Education / Special Education (v) Artificial Intelligence (AI) / Machine Learning (ML) / Blockchain / Cyber Security / Data Science and (vi) Public Policy, Strategic Management, National Security and Leadership. Tenure: Initial term is 01 year, extendable as per requirement up to a maximum of 03 years or till the age of 70 years. Eligible candidates may send their application and curriculum vitae to "**The Registrar, Hemchand Yadav Vishwavidyalaya, Durg (CG), Raipur Naka/Potiyakala, Durg, Chhattisgarh 491001." by speed/registered post by 06/02/2026** and send soft copy to **email: vc.durguniversity@gmail.com.** For detailed information, please visit the university **website www.durguniversity.ac.in.**

Sd/-
**Registrar**

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**Smt. Durgadevi Sharma Charitable Trust's**

## CHANDRABHAN SHARMA COLLEGE OF ARTS, COMMERCE AND SCIENCE

**(AUTONOMOUS)**

A.S. Marg, Powai Vihar, Complex, Powai, Mumbai – 400 076.

**MINORITY INSTITUTION**

**APPLICATIONS ARE INVITED FOR THE FOLLOWING POST FROM THE ACADEMIC YEAR 2025-26:**

**UN-AIDED**

| Sr. No. | Cadre | Subject | Total No. of Posts | Category |
|---|---|---|---|---|
| 1 | PRINCIPAL | -- | 01 | 01-OPEN |

The above post are open to all, however, candidates from any category can apply for the post.

Reservation for women will be as per **University Circular No.BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell/ICC/2019-20/05 dated 5th July, 2019.**

Candidates having knowledge of Marathi will be preferred.

**"Qualifications, Pay Scales and other requirement are as prescribed by the UGC Notification dated 18th July, 2018 Government of Maharashtra Resolution No. Misc-2018/C.R.56/18/UNI-1, dated 8th March, 2019 and University Circular No. TAAS/(CT)/ICD/2018-19/1241, dated 26th March, 2019 and reserved from time to time". The Government Resolution & Circular are available on the website: mu.ac.in.**

Applicants who are already employed must send their application through proper channel. Applicants are required to account for breaks, if any, in their academic career.

Application with full details should reach the **HON. MANAGING TRUSTEE**, **Smt. Durgadevi Sharma Charitable Trust's, CHANDRABHAN SHARMA COLLEGE OF ARTS, COMMERCE & SCIENCE, A.S. Marg, Powai Vihar, Complex, Powai, Mumbai – 400 076 within 15 days** from the date of publication of this advertisement. **This is University Approved Advertisement.**

Sd/-

**HON. MANAGING TRUSTEE**

**Radhanagari Taluka Shikshan Prasarak Mandal's**

# RADHANAGARI MAHAVIDYALAYA,

RADHANAGARI TAL.- RADHANAGARI DIST.- KOLHAPUR
(Affiliated to Shivaji University, Kolhapur)

**(Permanently Granted)**

## WANTED

Applications are invited from eligible candidates for the following posts:

| Sr. No | Name of posts | Total posts | Open Post | Reserved Category Post |
|---|---|---|---|---|
| A) | **Principal** | | | |
| 1. | **Principal** | 1FT | 1 | - |

**Condition: -** The matter of Governing body of the Management is sub-judice. Hence, approval to the said advertisement is subject to the final decision in all matters pending before Charity Commissioner.

**Note:** For detailed information about post, qualifications and other terms and conditions, please visit University **website: www.unishivaji.ac.in**

**Place:** Radhanagari
**Date:** 14/01/2026

(Shri. K. T. Patil)
**Secretary**

# माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.)

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.)**
**(Established in 1957)**
**Deemed University**
**(Declared under Distinct Category by Ministry of Education, Government of India)**
**NAAC ACCREDITED WITH A++ GRADE**
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**E-mail: vicechancellor@mitsgwalior.in, Website: www.mitsgwalior.in**

Ref. No.: Advt./Faculty & Staff/2026/1

## Recruitment Notification

Applications are invited for the following regular position of **Faculty** & **Non-Teaching Staff** and Contractual engagement of **Professor of Practice** at Madhav Institute of Technology & Science-Deemed University, Gwalior:

1. **Professor/Associate Professor/Assistant Professor (Engineering & Technology & Humanities disciplines)**
2. **Sports Officer (Female)**
3. **Student Counsellor (Female)**
4. **Personal Assistant (PA)**
5. **Professor of Practice (Contractual engagement)**

Eligible deserving candidates are required to submit the application in prescribed proforma available on MITS-DU website along with required processing fee and testimonials on or before 04:00 p.m. on **31.03.2026** to the office of the Vice Chancellor, MITS-DU Gwalior. Please visit the MITS-DU website **www.mitsgwalior.in** for application proforma and detailed information.

**(Dr. R. K. Pandit)**
**Vice Chancellor**

## SHARAD PRATIBHA PRATISHTHAN'S
## Proposed-RAMAKRISHNA POLYTECHNIC, Ramakrishna City, BALSOND,
## HINGOLI Tq. Dist – HINGOLI -431513 Mob : 09822704557

## APPOINTMENTS

Applications are invited from the eligible candidates for following posts with complete Bio-data/ Resume with two passport size photographs and testimonial should reach to the Secretary through **email: sharadpratibhapratishthan@gmail.com**

### Teaching Faculty

| Sr. No | Department | Name of Post | No. of Post | Qualifications |
|---|---|---|---|---|
| 1 | Administrative | Principal | 1 | ME/M.Tech with 10 years of experience |
| 2 | Civil Engineering | Lecturer/Asst. Prof | 2 | BE/B.Tech Civil (First Class) |
| 3 | Computer Engineering | Lecturer/Asst. Prof | 4 | BE/B.Tech Computer (First Class) |
| 4 | Electrical Engineering | Lecturer/Asst. Prof | 2 | BE/B.Tech Electrical (First Class) |
| 5 | Electronics & Telecommunication Engineering | Lecturer/Asst. Prof | 2 | BE/B.Tech Electronics & Tele Comm (First Class) |
| 6 | Artificial Intelligence & Machine Learning | Lecturer/Asst. Prof | 2 | BE Electronics with relevant subject knowledge |
| 7 | Physics | Lecturer/Asst. Prof | 2 | M.Sc Physics (First Class) |
| 8 | Chemistry | Lecturer/Asst. Prof | 2 | M.Sc Chemistry (First Class) |
| 9 | Mathematics | Lecturer/Asst. Prof | 2 | M.Sc Mathematics (First Class) |
| 10 | English | Lecturer/Asst. Prof | 2 | M.A. English (First Class) |

### Non Teaching Faculty

| Sr. No | Name of Post | No. of Post | Qualifications |
|---|---|---|---|
| 1 | Office Superintendent | 01 | B.Com |
| 2 | Account Officer | 01 | M.Com with Tally |
| 3 | Workshop Instructor | 02 | ITI/CTI (Carpentry/Turne Welding ) |
| 4 | Lab Assistant | 02 | Diploma /ITI/In Civil Mech Comp Electronics & Tele Comm |
| 5 | Lab Attendant | 02 | Diploma /ITI/In Civil Mech Comp Electronics & Tele Comm |

**Qualifications, pay Scale and experience are as per AICTE, DTE, MSBTE norms.**

**Secretary**

# Fatorda Salesian Society's
# DON BOSCO COLLEGE OF ENGINEERING

**Fatorda, Margao, Goa 403 602**

**(Approved by DTE, Govt of Goa, AICTE, New Delhi & Affiliated to Goa University)**

We are a society dedicated to the holistic development of students, empowering them to become well-rounded, skilled, and ethical engineers ready to address the challenges of the modern world. To fulfill this vision, we are seeking passionate and qualified educators to join our esteemed faculty team.

We invite applications for filling the following Teaching posts on Regular/Contract basis.

| Sr. No. | Department | Designation | No of Posts | Regular/Contract |
|---|---|---|---|---|
| 1. | **Mechanical Engineering** | Professor | 01 | Regular |
| | | Assistant Professor | 01 | Regular |
| | | Assistant Professor | 02 | Contract |
| 2. | **Computer Engineering** | Associate Professor | 01 | Regular |
| | | Assistant Professor | 02 | Regular |
| | | Assistant Professor | 04 | Contract |
| 3. | **Civil Engineering** | Associate Professor | 01 | Regular |
| | | Assistant Professor | 02 | Contract |
| 4. | **Electronics and Computer Science** | Professor | 01 | Regular |
| 5. | **Basic Science & Humanities** | **$** Assistant Professor | 01*<br>01**<br>01*** | Contract<br>Contract<br>Contract |

$ One post each of Asst. Prof. is for *(i) Chemistry **(ii) Mathematics ***(iii) English

**ESSENTIAL REQUIREMENTS FOR ALL POSTS:**

- Valid 15 years Residence / Domicile Certificate in Goa issued by the competent authority. (Office of Mamlatdar)
- Knowledge of Konkani
- Knowledge of Marathi shall be desirable

**NOTE:**

For position at Sr. No.1 to 4, the AICTE norms are strictly to be followed. For further details, kindly visit **www.aicte-india.org**

For position at Sr. No. 5, the UGC norms are strictly to be followed. For further details, kindly visit **www.ugc.ac.in**

The candidates are requested to download the application form from the college website: **www.dbcegoa.ac.in**

**Applications are also invited for filling up of the following post:**

**1) INSTRUMENT MECHANIC (1 Post – Contract)**

- Candidate having Diploma in Mechanical/ Civil/ Electronics with minimum 5 years of experience in maintenance will be preferred.

Interested candidates are requested to send their application in prescribed format along-with copies of all relevant certificates to the "The Director" so as to reach the Institute Office on/or before **30th January 2026.**

The envelope containing the application in prescribed format should be clearly **superscribed** with the Post applied for. Incomplete applications and applications received after closing date and time will not be entertained.

**Sd/-**
**Dr. Neena Panandikar**
**Principal**

**Sd/-**
**Fr. Wilfred Fernandez,**
**Director**

## Hyderabad (Sind) National Collegiate Board's

# Hashmatrai & Gangaram Himathmal Mansukhani Institute of Management

C.H.M. Campus, Opp. Railway Station, Ulhasnagar (W) - 421 003.

**Minority**

APPLICATIONS ARE INVITED FOR THE FOLLOWING POSTS
FROM THE ACADEMIC YEAR 2025-2026.

**UN-AIDED**

| S.N. | Cadre | Subject | Total No. of Posts | Category |
|---|---|---|---|---|
| 1. | **Director** | — | 01 | 01 - OPEN |
| 2. | **Associate Professor** | Management | 01 | 01 - OPEN |

The above posts are open to all, however, candidates from any category can apply for the post.

Reservation for women will be as per **University Circular No. BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell/ICC/2019-20/05 dated 05th July, 2019.**

Candidates having knowledge of Marathi will be preferred.

**The Educational Qualifications, Experience & pay-scale for the post of Director & Associate Professor are as prescribed by the University of Mumbai, AICTE & DTE from time to time.**

**Please refer University Circular No. मिशमाक / विशमाक / तंशिण / ११ / २०२०–२०२१ दिनांक ११ जानेवारी, २०२१ for qualifications and experience at the time of interview.**

Applicants who are already employed must send their application through proper channel. Applicants are required to account for breaks, if any, in their academic career.

Application with full details should reach **SECRETARY, Hyderabad (Sind) National Collegiate Board's, Mistry Bhawan, First Floor, 122, Dinshaw Wachha Road, Churchgate, Mumbai 400 020 within 15 days** from the date of publication of this advertisement. **This is University approved advertisement.**

Sd/-
**SECRETARY**

# Announcement
# for
# Special Issues of 'University News'

**Special Numbers of the University News on two different themes** are being brought out on the occasion of AIU Zonal Vice Chancellors' Meets—2025-26. The Special Numbers will cover the articles invited from eminent educationists and practitioners of higher education. 'University News' invites you, the Readers, also to contribute to the Special Numbers by submitting papers/articles. You can find details below:

## THEME 1: CREATING AI AND QUANTUM-ENABLED HEIS

**Special Issue on this theme will be brought out on February 16, 2026** on the occasion of Central Zone Vice Chancellors' Meet—2025-26 to be held at Osmania University, Hyderabad on **February 19-20, 2026**. Subthemes for this Special Issue are:

- ***Integrating AI and Quantum Technologies into Higher Education Curriculum, Pedagogy and Governance.***
- ***AI-Driven Indigenous Research and Product Development.***
- ***Global Regulatory Framework for AI and Ethics in AI.***

**The last date for submission of articles for this Special Issue is February 06, 2026.**

## THEME 2: SELF-RELIANT *BHARAT* THROUGH *SWADESHI*, ECONOMIC PATRIOTISM AND TECHNO-NATIONALISM

Special Issue on this theme will be brought out on **March 16, 2026** on the occasion of West Zone Vice Chancellors' Meet—2025-26 to be held at Janardan Rai Nagar Rajasthan Vidyapeeth, Udaipur, Rajasthan on **March 17-18, 2026**. Subthemes for this Special Issue are:

- ***Redesigning Educational Ecosystem to Promote Swadeshi***
- ***Promoting Research and Development in Indigenous Technologies***
- ***Economic Patriotism Leading to Economic Indigenisation***

**The last date for submission of articles for this Special Issue is March 06, 2026.**

Manuscripts may be sent to **Dr Sistla Rama Devi Pani**, Editor, University News, Association of Indian Universities, AIU House, 16 Comrade Indrajit Gupta Marg (Kotla Marg), New Delhi- 110 002, through E-mail: *ramapani.universitynews@gmail.com* with a copy to: *universitynews@aiu.ac.in.* Guidelines for contributors are placed on the AIU Website, *www.aiu.ac.in*. Papers will be published in the Issue, subject to the approval of the Editorial Committee of the University News. In case of space or time constraints, the articles submitted for these Issues can also be considered for publication in the general Issues.

Interested Universities/Institutions, Government Agencies, Publishers or recognised and reputed Organisations dealing with Education may give their Advertisement for publication in the Special Issues. The Issues will have Special visibility. Advertisement Tariff is available on the AIU Website: *www.aiu.ac.in*

For any queries, Contact Dr Yogita Kanwer on her mobile number 09968469765 or office landline number 011-23230059, Ext. 209.

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