NURTURING AND STRENGTHENING SUSTAINABLE INNOVATION AND ENTREPRENEURSHIP IN THE ACADEMIC ENVIRONMENT

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ABSTRACT

Nurturing and strengthening the innovation and entrepreneurship (I&E) in the university by involving teachers and students alike as sustainable entrepreneurs are central endeavours in this age of sustainable development today. This paper presents a generic sustainable framework for University system to nurture and strengthen innovation and entrepreneurship among faculty and student through the support of incubation centre.

At first the paper focuses on the need and importance of having incubation centre in the academic organizations. Further authors propose a framework to build entrepreneurial skills and mind-set among faculty and students. Emotional Intelligence (EI) plays a vital role in building sustainable entrepreneurship ecosystem, so efforts have been made to showcase the importance of EI.

Next the paper discusses on courses in sustainability education from Innovation & Entrepreneurship disciplines with shared goal to foster sustainability competence as global competence and shared pedagogies. The work also focusses on classifying the innovative project from academia based on their technology readiness Level (TRL) and support the mature technology to product level. The paper concludes with theoretical discussions on protecting innovation and few of the government initiatives to handhold ideas from academic campuses through a 6C model to create impact on the society.

Keywords: *Incubation, Innovation and Entrepreneurship (I&E), Patent, Sustainable development goals, Sustainable Entrepreneurship, TRL.*

INTRODUCTION

In the twenty-first century, economic expansion, social advancement, and environmental sustainability are all significantly influenced by innovation and entrepreneurship. The cultivation of creativity and critical thinking in students to foster innovation is one of the core tenets of NEP 2020, which serves as a framework for the educational system. It emphasises that innovation and knowledge production must stem from higher education, which will support the expansion of the national economy. HEIs will establish centres for technological development, start-up incubation, frontier research, increased industry-academic links, and interdisciplinary research encompassing the social and human sciences in order to concentrate on research and innovation. HEIs must take the initiative to do research in the fields of infectious diseases, epidemiology, diagnostics, and other related fields given the scenario of epidemics and pandemics.

One of the principles driving the NEP 2020 is creativity and critical thinking to encourage logical decision making and innovation. Teaching innovations is necessary for:

- Adapting to the changing needs of the evolving job market
- Fostering creativity and critical thinking skills
- Encouraging collaboration and problem-solving abilities
- Addressing the unique learning needs of each student.

SOME OF THE INITIATIVES BY THE GOVERNMENT TO NURTURE INNOVATION IN STUDENTS ARE AS FOLLOWS:

- Establishment of Institution's Innovation Councils (IICs) to systematically foster the culture of innovation and start-up ecosystem. Applied research, innovation and entrepreneurship are integral to IICs. HEIs to ensure a multidisciplinary interaction and partnership approach for boosting IP generation, enhancing innovation and start-up outputs from academic institutions.
- AICTE- IDEA (Idea Development, Evaluation & Application) Labs with prototyping facilities being set-up in institutions with a view to encourage students for application of STEM fundamentals towards enhanced hands-on experience and learning by doing. Also, to impart training on 21st century skills, like critical thinking, problem solving

and design thinking, collaboration and communication that can enhance their employability. AICTE approved engineering colleges with at least 10 years of existence and active accreditation to one course/programme course are eligible to apply under this scheme.

- Through related provisions of NEP 2020, integration of vocational education with educational offerings in institutions and mapping of local opportunities has been helpful in developing entrepreneurial competencies besides capacities and has helped make vocational education a part of the larger vision of holistic education.
- Some of the key achievements over the past 3 years that indicate the scale of implementation are setting up of 7265 Institution Innovation Councils (IICs) in 28 States & 8 UTs, and the funding of 106 IDEA labs since its inception in 2022. Overall, India's rank in the Global Innovation Index (GII) has leapfrogged to 40th position in 2022 from 52nd position prior to NEP release.

ROAD MAP FOR HEI'S

Promoting innovation and entrepreneurship takes a team effort from all facets of society and cannot be accomplished in a short amount of time. NEP 2020 has established a crucial route in this direction. Furthermore, the recent triumphs of Indian start-ups have sparked an entrepreneurial spirit among young people as well as in society at large, where business owners are increasingly regarded with admiration.

Institutions must foster a culture that values original thought and creativity, which can only be achieved by providing our teachers with the necessary training. The curriculum for the current trainings has to be updated, and programmes for training trainers need to be arranged appropriately. Training curricula for trainees must to emphasise the development of problem-solving abilities and incorporate a greater number of case studies.

ACADEMIC ENTREPRENEURSHIP

In the digital age, academic entrepreneurship is becoming an increasingly acknowledged new knowledge source and catalyst for change. In a geographical context, it plays a different role and makes a better contribution, and it is more highly valued in industrialised nations than in developing ones. The present study has primarily taken this into account by considering academic entrepreneurship in the context of underdeveloped nations. Universities are now attempting to support social and economic development in addition to their traditional roles in

teaching and research. Universities are not only adopting a new mission and strategy in relation to economic development, but they are also going through a transitional period and becoming more entrepreneurial in their behaviour [2]. Clark [2] and Etzkowitz [1] were the first to investigate. According to Etzkowitz [1], the role of universities is important in economic development, while, according to Clark [3], the entrepreneurial university is a process where the university seeks to innovate the way they manage their business. Academic entrepreneurship is the knowledge that academics, such as teachers, students and researchers, create through ventures, spin-offs, collaborations, patents and licenses [3]. This shows that there is and is a flow of information from students, professors and researchers to the university. Therefore, entrepreneurship has attracted the attention of researchers in the formation of entrepreneurial intentions [4]. A goal is a mental state that shapes personal attention, creates experiences, and directs behaviour toward entrepreneurial goals [4]. Thus, young people are driven to entrepreneurship, which reflects a combination of both personal and contextual factors [5].

Academic entrepreneurship consists of a series of activities that include commercialization, collaboration with the industry, and stakeholders. However, commercialization includes entrepreneurship activities, publications, and the development of entrepreneurial graduates [5]. The recognition and transition of entrepreneurship in academics is influenced by several factors [5]. This has influenced knowledge and knowledge communication, with an increased demand for knowledge creation [4]. Therefore, there is increase in demand for graduates with an employability and entrepreneurial mind-set and entrepreneurial skills, due to technological, social, and economic changes [5]. Universities provide social benefits and contribute to economic growth by pursuing academic entrepreneurship and related endeavours [6, 7].

OVERVIEW OF ACTIVITIES AT DIFFERENT TECHNOLOGY READINESS LEVELS (TRL)

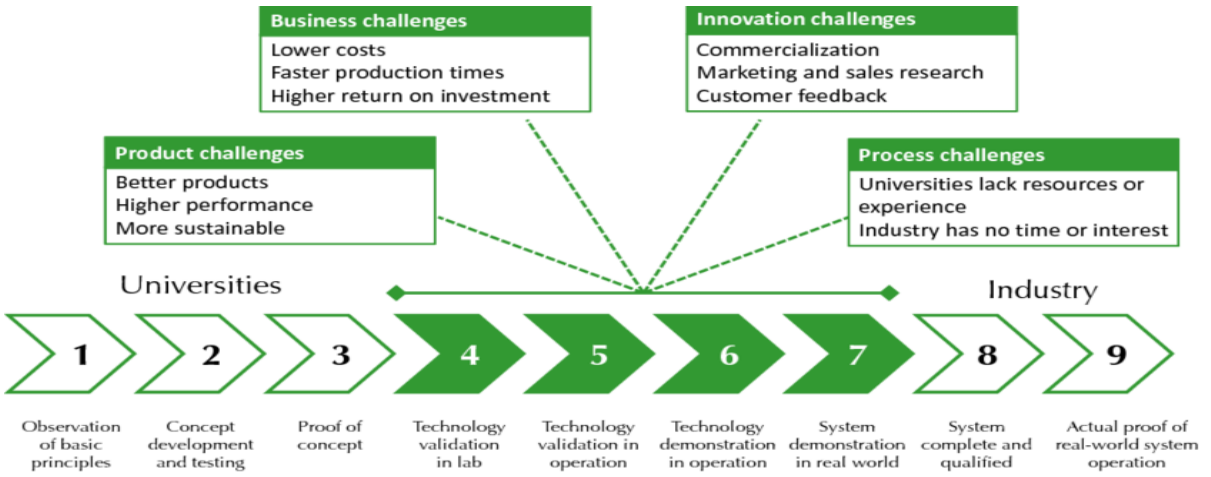

Figure 1. TRL and activities

Basic research is mainly done with public funding, whereas private investors are mostly interested in working towards commercial viability. This leaves a void in the middle.

- The investment required in this area is generally high, but the certainty of success relatively low. Only few technology concepts will develop into successful commercial products.
- There is a lack of tools that can provide insights into building-integration issues in an early R&D phase (TRL 1-5). This results in a mismatch between information need and availability and complicates decision-making.
- The process requires an interdisciplinary approach. The right combination of skills and expertise may not always be available.

ACADEMIC ENTREPRENEURSHIP

TRL is a method used to assess the maturity of a technology. NASA developed it during 1974 in respect of planning the Jupiter Orbiter design team. The original definition of TRL involved seven levels of development stages, but the current one, which has been adopted by NASA and European Union, now has nine levels.

TRL 1—Basic principles observed.

TRL 2—Technology concept formulated.

TRL 3—Experimental proof of concept.

TRL 4—Technology validated in laboratory.

TRL 5—Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies).

TRL 6—Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies).

TRL 7—System prototype demonstration in operational environment.

TRL 8—System complete and approved.

TRL 9—Actual system proven in its operational environment (competitive manufacturing in the case of key enabling technologies; or in space).

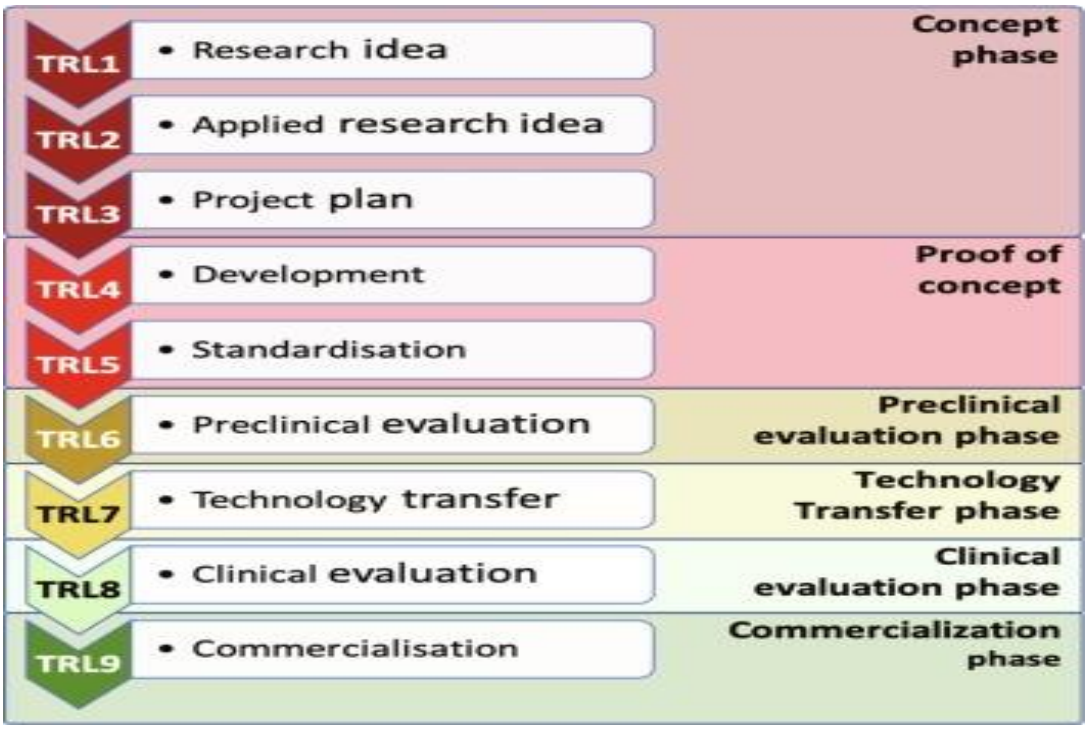

Figure 2. TRL 1-9

PROPOSED 6C MODEL FOR STRENGTHENING INNOVATION AND ENTREPRENEURSHIP ECOSYSTEM AT HIGHER EDUCATION INSTITUTION (HEI)

6C Model to be implemented by HEI's are:

1. **Creating and implementing entrepreneurship development curricula**: Including entrepreneurial education by introduction of a module on entrepreneurship that addresses all significant business features. Aspects including incorporation, legal foundations, finance & accounting, marketing, and promotion, among others, may be covered in the programme.

   In order to help applicants comprehend the advantages and potential of entrepreneursh

ip, the module may also raise knowledge of various government programmes to suppo rt entrepreneurship.

2. **Creation of Incubation Centres:** Formation of incubation cells for development of business ideas at a regional or state level to assist trainees in formulation and fruition of their plans may also be undertaken. Being embedded in an institution, an effective entrepreneurship and incubation support cell may provide assistance to cover plethora of activities for development and promotion of entrepreneurship. The cell may guide and assist prospective entrepreneurs on various aspects such as preparing project reports, obtaining project approvals, loans, and facilities from agencies of support systems and information on various technologies.
3. **Conducting state and national level competitions:** Conducting innovation and idea-based competitions coupled by mentorship support may foster the spirit of entrepreneurship among students.
4. **Collaboration with the private sector (Institutes, Industries, Incubations):** Institutes may focus towards partnering with corporates, foundations, and other research-intensive institutions. This will enable trainees and instructors to exchange ideas inside and outside the institutes, thereby help to prepare students to be citizens of a rapidly changing world. The institutes can provide a platform for interaction with entrepreneurs via guest lectures and industry visits.
5. **Co-creating and Promoting diversity and inclusion:** A more diverse group of trainees shall lead to broadening the trainee exposure, peer to peer learning and provide different ideas.
6. **Certified NIEBUD trained instructor at each institute:** Availability of NIESBUD trained instructor who can promote entrepreneurship by introducing it at an early stage.

CONCLUSIONS

The role of universities, which educate, train and prepare graduates to become masters of their careers, is crucial to the sustainable entrepreneurship of the region. Despite the many challenges and obstacles in the entrepreneurial process, the inspiration of self-confidence and independence of educated youth is of great value for their unparalleled pursuit of sustainable entrepreneurship in developing regions. In this study, we have focused on various government initiatives for strengthens I&E at HEI. TRL's are discussed mapping to various activities to take innovative projects to product level. The proposed 6C model that can be implemented by

institutions and HEI's as an additional effort to activate entrepreneurial spirit among minds and hence building Atmanirbhar Bharat.

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