Global Journal of Flexible Systems Management (June 2021) 22(2):141–155
https://doi.org/10.1007/s40171-021-00265-x

ORIGINAL RESEARCH

Innovation Framework for Excellence in Higher Education Institutions

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Received: 23 January 2021 / Accepted: 1 March 2021 / Published online: 26 March 2021

Abstract *Innovation is now emerging as an "Asset" in current global health scenario caused by pandemic, so higher education institute (HEI) should put high value primium on this asset, i.e. innovation, and with the passage of time, the intervention and demand of innovation in higher education cannot be undermined. In this context, it is very important that the real understanding of the process of innovation is highly desirable. Knowledge-driven economy has established its roots globally and with the passage of time, it will grow as banyan tree. The challenges before higher education institutions (HEIs) is to train the people to the highest level of efficiency, creativity and entrepreneurship. HEIs have to choose between being globally distinct and the best vs. enormous and the largest. The biggest challenge before HEIs is financially self-reliance as the government and research funding is very scarce and it will further decrease in the coming time. Innovative solutions will be in demand and the new primium currency of the future. Public objectives in teaching and learning process embedded with innovation must be supreme. In this paper, an innovative framework is emphasized for HEIs for their academic excellence. Triple helical model is no longer sufficient. HEIs have to think and add more dimensions to their innovative functioning which make them efficient and environment friendly. The objective of this study is that the HEIs should become globally distinct and competitive, by creating their own distinct products, services and related processes which proposed high value to their customers and stakeholders for their economic robustness and sustainability in flexible mode.*

Keywords Competitive · Economic strength · Flexible · Globally distinct · Higher education institutions (HEIs) · Innovation · Sustainability · Teaching and learning process

Introduction

Intrinsic motivation, autonomy and inherent diversity are the key elements of innovations. Ancient India is known for innovations—decimal system, Fibonacci numbers, binary numbers, Wootz steel, ruler, seamless metal globe and many more. Today, Pentium microprocessor chip is attributed to an Indian—Vinod Dham, and the USB port for seamless transfer of data is credited to another Indian—Ajay Bhatt. Albert Einstein rightly said, "We owe a lot to the ancient Indians, teaching us how to count. Without which most modern scientific discoveries would have been impossible". India had great teachers of all times and once considered a heaven for knowledge creation in all the areas of human endeavours. The *MAHARISHI*(महर्षि) of India not only excelled in their chosen fields but also influenced the thoughts and actions of the society through their teachings. One of the greatest teachers—Acharya Chanakya, famous wordings on education, "Education is the best friend. An educated person is respected everywhere. Education beats the beauty and the youth" is an example of diversity of all times. The very distinguished teacher of modern India—Dr. Sarvepalli Radhakrishnan's, message is very loud and

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clear on autonomy—"The end-product of education should be a free creative man, who can battle against historical circumstances and adversities of nature, and exhibits versatility and efficacy of education". It is the intrinsic motivation that made Acharya Chanakya and Dr. Sarvepalli Radhakrishnan, and many more very distinct and innovative. The proposition is—*experiences of the past are very useful to innovate your present and future*.

Literature Review

In 2020 ranking, "*The QS World University* ranked (2020), Massachusetts Institute of Technology" as the top university in the world, while "*The Times Higher Education World University* ranked (2020) Oxford University" as number 1. The proportion of the population in higher education in India is still less than 10% of 130 crores, while Korea, Japan and the USA are having 69.8%, 61.5% and 50.4%, respectively, in the age group of 25–34 years. Demographic expert Wolfgang Lutz et al. (2014) said that education permanently improves a person's cognitive abilities, allowing better planning and self-control throughout the rest of their life. A study (Singh, 2016) on Indian higher education system revealed that we are delivering a twentieth century education to twenty-first century youth and preparing them for the unknown economy and society. There is naturally an enormous dichotomy between what is needed and what we deliver, and the result is obvious—large scale of unemployment in educated youths. New education policy has taken steps to make the education student-centric instead of teacher-centric, and it creates a hope that we shall be doing better in the time to come. The policy aims to identify and foster the unique capabilities of the students, examine and promote creativity and critical thinking, improve and enhance decision making and innovation with extensive use of technology.

Innovation in education system—mainly higher education and research, demands flexibility (Shukla et al. 2019; Evans & Bahrami, 2020) and out-of-box thinking. And when combined with the entrepreneurial philosophy, experiential learning and modern IT-enabled click, it can renovate the quality of life and prosperity of nations. Even the evaluation process should incorporate more elements, like multi-dimensional and multi-directional solutions. Greater magnitude and all-inclusive with national and global mentors and learners are the need of today as well as that of future. An optimal mix of business orientation, entrepreneurial skills and leadership skills; compassion, ethics and values; and crowd-sourcing of ideas and projects is important for gig economy. It is more pertinent to an innovative education system that higher education institutions (HEIs) should impart education and skills to create, innovate, problem solve, crisis management, design thinking, critical think, teamwork and create prototypes or templates for artificial intelligence. What comes to ones' mind when we dialogue about innovation in an HEI—a university, a science research centre, an engineering college, a medical institution, a management school, a design academy, a professional society or a scholastic foundation of national or global repute? If you say that the process of innovation is very challenging and demanding, and many times serendipitous and fortuitous, in the present era, it is very critical for the success of institutions, its students, its faculty and its reputation and global standing.

When one visits to VISION and MISSION statements of different kinds of institutions, one will always find some common words. An analysis of 291 vision statements and 338 mission statements of the universities worldwide by Cortes-Sanchez (2017) identified that the five most frequently used terms were "research", "university", "world", "knowledge" and "education", and the five least frequent terms were "enterprising", "preservation", "respect", "heritage" and "lifelong". Global, excellence, multi-skilled, learning, creative, innovation, entrepreneurial, etc., are the new additions in the Cortes-Sanchez's list. Let us have a look on mission statements of some of the universities.

- "Massachusetts Institute of Technology-To advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the twenty-first century"
- "Oxford University-To deliver life-enhancing experiences to help students worldwide to develop personally and professionally and that enrich their future opportunities".

  About 30 years back, none of the university or institute in India was using mission statement (MS) and/or vision statement (VS) to exhibit its propensity. But now both mission and vision statements are used as tactical planning gadgets worldwide. Though it has been contended that these statements represent the actual purpose and future course of action for the academic institutions, the available literature on MS and VS content analyses has shown no correlation between the two. However, the use of MS and VS by the academic institutions has resulted in a necessity for self-awareness, an overall emphasis on state-of-the-art knowledge to the students, a general focus on research and innovation and an aspiration to be global. Let us examine the followings:
- "IIT Kharagpur-The Institute aligns all its activities to serve national interest and seeks-To provide broad-

based education, helping students hone their professional skills and acquire the best-in-class capabilities in their respective disciplines: To draw the best expertise in science, technology, management and law so as to equip students with the skills to visualize, synthesize and execute projects in these fields: To imbibe a spirit of entrepreneurship and innovation in its students; To undertake sponsored research and provide consultancy services in industrial, educational and socially relevant areas".

- "Delhi Technological University-To establish centres of excellence in emerging areas of science, engineering, technology, management and allied areas; To foster an ecosystem for incubation, product development, transfer of technology and entrepreneurship; To create environment of collaboration, experimentation, imagination and creativity; To develop human potential with analytical abilities, ethics and integrity; and To provide environment friendly, reasonable and sustainable solutions for local and global needs".

From the above, it is evident that mission statement of Delhi Technological University is having all the elements of innovation—ideation, execution, collaboration and value creation.

Innovative Ideation

The process (Celuch et al. 2014; Dam & Siang, 2019; Fleming, 1978; O'Reilly et al. 2019; Serdyukov & Makhluf, 2014) of forming new ideas, new images, new similes, new idioms, new horizons, new concepts, new beginning, new management, new technology or altogether a new world that makes complete sense—comprehensive, widespread, extensive, unique, exclusive and exceptional, is highly challenging. How can an HEI think, design, translate and achieve such ideation? Even ideation should embrace all the elements of innovation (Dorow et al. 2015; Scaglione et al. 2019). The HEIs need to possess some critical proficiency to have a competitive advantage during foreseeable period, which depend on half-life of change in education system. Innovative ideation process has been identified and promoted by educational leaders for the global advantage of the institution, the university or the country education. HEIs are at nascent state in the process of training or teaching others who can design and develop a valuable teaching model and curricula. As educators prepare effective human resources of tomorrow, it is critical that we understand the situational path of progress that can prompt the design of innovative annotations for the solution of complex organizational issues. Innovative ideation starts with inputs, grows with personnel and impacts the organization and keeps flowing from one end to other depending on HEI management culture. Success of one innovation takes it to others; patents and ideas are the raw materials, and design thinking is a lens that helps us to make an innovative idea to the real one.

It is now well established (Petersson & Lundberg, 2018) that ideation comprises six basic constituents: subject—the education system and its characteristics; ideation mechanism—the process of innovation; the innovators—the experts group involved in ideation; decision takers—the management group evaluating ideation; innovativeness—characteristics for evaluating idea quality; and standards—parameters for determining the worth of ideation. Evaluation of ideation along with setting standards is the most critical to reach on the top or to become number 1. Detailed R&D or deliberation on the ideation will finally depend on the rate of idea generation; the total number of ideas generated during entire duration of discourse; identification of innovative, more innovative and outstanding ideas; and then "Quantify" the "QUALITY" ideas (Reinig et al. 2007).

A large number of institutions have shown great faith in their employees and imbued in its ideation process. Adobe encourages its employees to use the company starter kit for generating new ideas which are supported by liberal seed funding. "Hackathon", an intense idea-generation process, is very popular among several MNCs, software developers and HEIs. It has been very useful in improving customer service, advertising movements, internal operations, and even for innovative process and product development (Singh & Sushil, 2004). All idea-generation techniques generally promote incremental innovations. Ideation process is composed of scale of ambition and innovation zone bounded by definite boundaries. Setting a scale of ambition involves in defining aspiration for a new business, corporates strategy and promise and propagates a thinking process from existing to large with incremental advances. Innovation in HEIs cannot be scaled to infinite. It is imperative to put precincts around ideation by defining the markets, commerce models, positive/negative situations and/or clientele to focus on. The people-oriented ideation methods, like Hackathons, Crazy 8 s, etc., can evolve a plethora of ideas that can be used for innovation. Ideation is an essential vocation but not adequate first step in ambidexterity (Katic & Agarwal, 2018; Ganuthula & Sinha, 2019). Even a creative and innovative ideation approach does not give final verdict, and finally, you have to choose the good ideas that are worth incubation.

Execution of Quality Ideation

A global model for the management and development of knowledge in HEIs is based on incubation. Equipped with potentially flexible resources (Bondzi-Simpson &

Agomor, 2021), it is capable of taking new missions in almost all the areas of global and local importance. Self-initiation by US universities during the Second World War to take on military R&D responsibilities did wonders in US victory; Resource Crunch in Brazil during 70–80s was handled successfully by the universities, initiating large-scale technology projects by establishing innovative incubators. The HEI shares innate incubators that sometimes play an entrepreneurial role in the evolution of its own development as well as in the development of innovative enterprises (Melnik et al. 2019; Sharahiley, 2020). The University of Zambia, during communication breakdown of the country, extended its internal network across the country, leading to the foundation of ZAMNET.

In the year 2019, "Blue energy" and "Life Science district" were the key technologies, which earned Stanford University the top slot among the Reuters' ranking of the World's Most Innovative Universities. Out of 728 patents, 397 were commercially successful with commercial impact score of 75.2. Innovative incubation is linked with quality ideas that HEIs can patent, publish, produce and market. Success of Stanford is facilitated by its innovative researchers and its multi-dimensional strength. Founded in 1425, KU Leuven has been assessed Europe's most innovative university in 2019. With 305 patents and commercial impact score 43.3, KU is known for new generation of solar panels that can efficiently produce hydrogen gas out of thin air, creating new record of efficiency. An array of 20×1.6 sqmtrs. panels could meet the energy needs of an average Belgian family for an entire year. Pohang University of Science & Technology has achieved a distinct position in Asia in 2019 Reuters' ranking. Founded in 1986, the university is having 349 patents with commercial impact score of 48.8 and developed artificial corneas that are 3D-printed out of tissue-derived "bioinks"; invented a method to keep therapeutic stem cells in place inside target organs using a protein secreted by mussels; and became the first university in Korea to offer short "nano-degree" masters programs. One thing is common in these top ranking HEIs and that is R&D for new technology to the benefit of world population. Also, novel thinking in R&D of academics has made these universities the most innovative in the respective region and globally also. The most distinct disclosure of incubation is that digital revolution is accelerating. Advances in automation, the digitization of information, unprecedented access to data and the globalization of knowledge are transforming every sector of economy (Sushil, 2015).

Universities and HEIs, retaining their core mission of educating the next generation, must embrace innovation to catalyse economic development by adopting all or some of the 12 technologies—mobile Internet, automation of knowledge work, the Internet of things, cloud technology, advanced robotics, autonomous and near-autonomous vehicles, next-generation genomics, energy storage, 3D printing, advanced materials, advanced oil and gas exploration and recovery and renewable energy. Innovation ecosystems and economies of the HEIs can be improved by fostering entrepreneurship, encouraging collaboration with private sector, promoting diversity and inclusion and exploring the nexus of technology and society.

The technical universities have become the focal point to fill gaps in the region's innovation. HEI experts play hybridized roles to start entrepreneurial academics, academic industrialists, business strategy in government and many more. The incubators are institutions that encourage and provide a home for these hybridized roles. The powers of knowledge, imbibed in HEIs, change the agenda for economic development policy especially at the regional level. For example, establishment of university during the decades of 70s and 80s in UP state drastically changed the patterns of higher education. Similarly, technical institutions in Tamil Nadu, Karnataka and Maharashtra widely affected the economy and the society in these States. Conversely, the exercise of power, at the multinational, national and regional levels, encourages knowledge producers. Demand in computer science and information technology, energy sciences and molecular biology has opened new vistas not only for the HEIs but also to industry. It is adopted by both to move from basic to applied research to production.

Innovations demand for triple/quadruple helix approach (Hattangadi, 2019) innovate further. Initially, a linear model of education was there in the HEIs—teachers were imparting available knowledge to the students and some research. DNA's "double helix" model was extended in education by intertwining industries into it. HEIs–industry–government interactions are the basis of triple helix model (Leydesdorff & Etzkowitz, 1998). The HEIs and other knowledge-producing institutions; industry, including high-tech start-ups and multinational corporations; and the government at various levels have joined together to innovate further. While industry and government have traditionally been epitomized as prime spheres, in the triple helix model, HEIs are posited to be a principal sphere. The extent of overlap and the dominance of the 3 will depend on situation. If State dominates, it will have major share, while in a democracy, all will share equally. The triple helix model is also diverse from separate institutional spheres. From either of the starting points, organizational spheres are "taking the role of one other" spinning-off hybrid institutions and actions—the innovation movement, embodying elements of the triple helix. HEIs are now focusing on "quadruple helix model" incorporating professional societies, alumni and research institutions as the 4th loop of system. At present, the role of these institutions

is very limited, but in future, it will expand and play a dominant role in innovating HEIs. An incremental approach is always more beneficial. Once the process of ideation is finalized, the new beginning is required to be processed. In past 3 decades, HEIs and universities, particularly in private sector, have adopted this. However, in a very well-developed system, same approach will work. To incubate, one can adopt either "outside-in" or "inside-out" model; in the former, boundaries are made permeable to all, while in the latter, core team members are involved in the process.

Chesbrough and Bogers (2014) have observed that all the smartest people do not work for a company, and that an institution does not have to conduct the research to gain from it. Apple, Google, Amazon and Intuit tap the creativity of outsiders by sharing their intellectual property to develop new products; Lego, P&G invited customers to suggest ideas for new products and services; NASA, InnoCentive and Kaggle organized contests for participants to find solutions; and IBM, Wikipedia and Facebook fostered networks or communities of interest. In HEIs, human capital is the most important. Each one of the experts can contribute in the process. However, the experience and expertise of the professors so much varied, in design as well as in concept, that its assimilation needs great thinking and efforts. HEIs and universities may establish a start-up ecosystem whose sole objective should be to gain a deep insight into the innovation proposed. Further, it may identify and exploit synergies between different opportunities for growth, new technologies and new curricula and new markets. The start-up ecosystem of HEIs may adopt the model of David Kelley/IDEO on design thinking. It provides vital clues and broad spectrum on incubation and scaling.

Innovation in Quality Ideas

Incubation of quality ideas is the pathway to reach to the goal. Though selection of quality idea itself sets the goal, achieving it successfully by marching on E^3-path (E^3 is energy efficient, environment friendly and economizing nature) is important. Madjar and Shalley (2008) examined effects of multiple goals on three different tasks and concluded that assignment of goals had a positive, significant effect on the innovation. Further research indicated that assigning goals to individual on all tasks exhibited a higher level of creative performance. Goal setting is a course of action to set intents, objectives and aspirations for HEIs, and this helps in achieving higher levels of performance. Patterson and Zibarras (2017) documented goal setting as an indispensable part of university management. Doran (1981) proposed that in an HEI, goal setting should follow SMART—specific, measurable, achievable, relevant and time bound, which will be highly beneficial for an academic administrator to achieve better results.

American Society on Higher Education (Boris et al. 2008; Brennan et al. 2010) emphasized the importance of diverse team—both demographic diversity and diversity of social roles to achieve bigger goals with higher performance. Research has identified eight common team member roles: Completer-Finisher, Implementer, Team Worker, Specialist, Monitor Evaluator, Coordinator, Plant, Shaper and Resource Investigator (Belbin, 1981, 1993, 2004; Arizet et al. 2007; Dierendonck & Groen, 2008, 2011; Smith & Yates, 2011). Effective team leaders are aware of the different roles that individual team member has adopted and uses this awareness to lead the team (Clawson & Huskin, 2006). Whatever expertise the team members may possess, they will proceed through stages, and a deep understanding of these stages is important for success. During the forming stage, it is important that the team members devise innovative process to know each other and find out the most appropriate ways and means to discuss, deliberate and work together. The storming and norming stages are the key for the successes and innovations. The team members engage themselves to resolve and find solutions to overcome the conflicts. The stages will witness setting up of formal or informal collective rules to design the framework. During the performing stage, innovation in working together with logic and openness to accomplish the goals and agreement on the detailed document for the quality idea are important. Team may go to adjourning stage, if so decided, but the innovation is a continuous process for achieving new goals for the organization. Successful team leaders always keep an eye on the whole process to keep themselves aware of the developmental stages. They choose to intervene at the time and space that makes the whole process the most effective. Integration of goals, roles and stages in HEI teams is important to have an innovative preposition to have a radiant success for the organization.

SMART will always be in the centre. Roles of team members can be compartmentalize, but it will be more appropriate to interchange the roles within a time frame to achieve higher levels of performance. All the team members must exhibit highest level of clarity in understanding each element of SMART (Aghera et al. 2018; Belbin, 1996; Bjerke & Renger, 2017; Fleming, 1978; Ogbeiwi, 2017). A goal that would simply say, "We will do our best" is fuzzy and not specific. The goal, "Department of Biotechnology is in high demand and we should increase the graduation intake by 50% in the year 2021" is specific. Specific goals are more likely to result in higher team performance. Similarly, measurable is an important element of goal setting. For example, a goal that states, "We will increase/reduce the elective papers in UG by 2 in each

semester" or "each student is required to complete a project in relevant industry in the vacations after 2nd semester" is measurable. However, a goal that states "It will be better to improve learning experiences of the students" or "writing skills of each student will be enhanced" would be difficult to measure.

Setting achievable goals are bound to motivate team. The team should always keep aside too high or not achievable goals, e.g. "We will admit only top 20% of the students who appear in the admission test 2022", could be achievable and therefore motivate the team. However, a goal that states "We will admit largest number of students in UG courses in the country in 2022" could be too high and therefore will not motivate the team because they could not see how it could be accomplished. Attainable goals are better and more likely to result in higher team performance. Relevant goals have important meaning within the context, must imbibe the mission and strategies of the university and should be consistent with aspiration of all the stakeholders within the university and to the nation at large. For example, a goal that states "We will invite 500 companies for job placement of students" is relevant. But if one say "We will increase our involvement in community based organizations and social services" may not be as relevant to the purpose of the team. Relevant goals are always better and result in higher team performance. Time is important and when one say that my goals are time-bound. Then, the HEI wishes to accomplish it by a specific time or date. By making the goal time bound, it will be possible for teams to know when they should focus their energies toward accomplishing the goal. A goal that states "In academic year 2021–2022, we will increase the number of faculty peer-reviewed publications by 10%" is time-bound. A goal that states "We need to improve the quality of our research productivity" is not time-bound. Time-bound goals (Belbin, 1996) are better and always lead to higher team performance. So, decision-making teams of the university must always opt for SMART which will result in higher performance. Setting goals alone will not achieve the optimal level of performance. The effectiveness of these goals will be enhanced when they are used in a context in which teams understand the different roles that team members play, and also the stages of the life cycle of teams. Thus, when all of the members of the team focus on the same SMART goal, the team will be more likely to accomplish that goal.

Team Roles in Higher Education-Innovations

Academic leader and team members are always building blocks of the higher education institutions. Some people have formal roles, and many others may have informal roles. Theory of Belbin (1993, 1996, 2004) is very important in team building. Idea that each of us possesses different behaviour pattern that determines the behaviour of one in relation to another in facilitating the progress of a team is well established with the passage of time. It has been identified that there are common clusters of these behaviours, and these clusters are stable enough to be separately identifiable. In a team, there are nine main roles, and all the roles are significant, though some have a higher profile than others. Everybody seems to have a preference for one or more of these "Team Roles" when behaving naturally in a group. If you have more than one 'natural role', then you can switch between them if you choose, and this is useful knowledge if you ever need to fill a different role in a team. Using Belbin model (1996), it is easier to predict whether a team would succeed or fail. Thus, the decision-making leader can make a failing group succeed by adding somebody with the right role or make a successful group fail by taking away a vital supporting role. For higher performance, it is important that team members identify, share and discuss their roles and refine things to assume more than one role.

Belbin model (1996) is significant in pinpointing of team composition, team achievement, team roles, individual roles and individual performance. Though there is a natural danger in providing "name tags" or "putting people in boxes" by using these types of approaches, it may help the team to move from the WEAKNESSES to STREGTHS. Development of individual is also important in a team, and for that, the leader has to carefully choose the tasks, goals and jobs that would give the individual the opportunity of working within a role that they can manage. They will face a developmental challenge by taking up the role, but they will not be placed in a situation where they will inevitably fail. Ideally, the individuals should be in a position within a team where they are in their preferred roles.

It has been identified that team has to adopt a strategy to complete the task, and it has to go different phases, viz. forming, storming, norming, performing and adjourning. In addition, team also move back and forward among these different stages as well. At the forming stage, it is always better for team members to leave the individual behind and accept and understand and their role as a team member. Initially, the team members may be highly attentive to information to understand how they will operate. In an HEI, the forming stage may be dominated by people with stronger personalities or with higher ranking formal roles and job titles. The team leader can facilitate effective functioning of the team by the process of de-freezing and encouraging all team members to participate and contribute. At the storming stage, the members may have different opinions and conflicts. Unanimity on team function, roles, strategies and tactics is very important for

innovation. Storming must be vibrant and effective; everyone should be free to speak their mind, leaving aside conflict and accepting the diversity of academic disciplines. The team leader can facilitate effective functioning. At the norming stage, team members find ways to resolve and finally agree to the best. Once norms are established, lot of innovative patterns of social interaction will flow in and out to make the system innovative. At this stage, team leader efficacy will be in listening the team and put forth his advises.

At the performing stage (Bjerke & Renger, 2017), the team focuses on achieving the goal. Thought process of individual member becomes very important at this stage. Active and energetic participation of all team members is highly desirable, even on those elements which percept as less important. For example, if the faculty members of the team feel that their participation is not going to add any value to them in their career progression, then it may not be viewed as important as other activities such as research and teaching. Another reason for sluggish participation in the team is when one views it as conflicting with other work roles or his ideas are not given due importance. The team leader support becomes very important, which may be provided by greater presence, reviewing team performance, encouraging and motivating team and emphasizing the importance of the goal. This generally helps the team to move further with excellent results. All the findings, suggestions, creative art and innovative process become the part of team work for the next stage—the adjourning stage. This stage is important as the several team members engage themselves in unproductive activities that are not linked to the mission. Recognition and rewards for the performance become very important at this stage. The leader can facilitate successful adjournment by praising, by thanking and by recognizing the dedication of team members. For example, in higher education settings, certificate of innovations, medals and awards, appreciation and recognition letters, etc., are considered to be very important, and the role of cash rewards is always better appreciated. There is an important relationship between team functioning levels and team performance targets. Both functioning levels and targets need to be managed synergistically in order to facilitate higher team achievements. For innovation unlimited, team leader may help the team to establish SMART goals during the early stages and maintain focus on the SMART at various stages of life cycle to avoid "mission creep".

Innovations in Teaching Learning Process

Students and professors are the key elements of an HEI. Great institutions are known by their students and faculty. Amongst all the stake holders of an HEI, faculty is always at the centre. Knowledge dissemination and creation are the main task which professors perform. Knowledge dissemination (Supermane & Tahir, 2017; Paniagua & Istance, 2018; Supermane, 2019; Acharya, 2019) must focus on sound understanding of fundamentals, their application in new areas and state-of-the-art information on the subject. Another, which is more important, is to make the student expert in the specific skill or skills, positive thinker, problem solver and ethical by nature not by design. Research and innovation are essential part of teaching learning process in HEIs. Most of the research focuses on the extension of research pursued by the faculty or its group. But, it is the pertinent time that all the professors must orient towards creating new processes, new designs and new materials which are energy efficient, environment friendly and sustainable. All the elements of innovation must be assimilated and absorbed within to implement something new. Faculty and students should have clarity that innovation is neither art or science or technology, and it is process of implementation of something new which is not only sustainable but also keeps pace with time.

A good library is indispensable, and it contributes significantly to the achievement of students and faculty of an HEI (Barathi et al. 2017). It always helps in providing high-quality research and learning environments that meet group and individual needs. An innovative library is reservoir of physical and digital knowledge of very learned academician, and it helps in developing, promoting and providing access to scholarly collections and resources across multiple sites (Yanxiang, 2016). Library should act as a classroom, laboratory and workshop by providing online lectures, virtual experiments and design and real online description of methods and processes. It can help the students and faculty by providing materials from other libraries, copyright education and advice for the development of programs and resources. With faculty participation, it can ensure explicit development of information research, learning and employability skills; research data management across the University; information related to University's research outputs; nurture culture of publishing; and facilitate and promote internationalization strategies and enrichment of library staff capabilities and skills.

Economics and enterprise development have become a very important element for an HEI in new regime (Chen et al. 2018). Financially, self-reliance is the watch word. All the HEI resources should be utilized in this direction profitably. Facilitating students in the process of enterprise development will lead to financial stability for the university and creating value addition to the enterprise owner. A rich, generous and admirable space for developing creative art and global skills in sports is equally important for the innovation. Extracurricular and sports activities help students to expand not only their networks but build HEI

image. It helps in making friends in different states and countries. Providing the best facilities for these activities, a dynamic and vibrant campus shall be visible to one and all. Moreover, it helps students and faculty to promote cultural integration and improve social skills. Participation in extracurricular and sports activities equips students with leadership skills, teamwork, time management, communications skills, interviewing skills, and office environment flexibility (Jena & Memon, 2018). Even volunteering to these activities can help you sharpen the skills and plethora of opportunities for feeling and working.

Innovations in Administration Process

Academic administrators are the backbone of any HEI. An institution will have distinct position among the local or global level if it has super infrastructure. In the present era IT-enabled classrooms, state-of-the-art laboratories, workshop and hobby centres, precision instruments for researchers and an excellent design and development centres to explore creativity, innovation and incubation have become necessity to faculty as well as to the students. All this cannot be done or achieved without the support of administration.

Parkinson's law (2003) has exposed the inefficiencies of system of governance in all organizations, and the Peter and Hull Principle (1969) has exposed the imperfections of meritocracy. No innovation is possible if "administrative work expands to fill the time available to complete it". It is very well established that the managers crave power and more people to order and, more people create more work for each other. Parkinson's law is valid for all organizations devoid of good leadership, and people are promoted to their levels of incompetence. From an innovator's standpoint, meritocracy is important and more important is to develop this culture with an efficient system to support it. However, the criteria for systematic and incremental progression must focus on collective creativity, intimate collaboration and the enormous capacity to learn and change for the better.

There are several activities related to students, faculty and team members. Each and every team member in administration has specific role. Compassion, efficiency, reliability and strict discipline are required to perform the assigned duties. Visionary administration of HEI always strives for a vigorous, young, healthy, creative, progressive, vibrant and flourishing campus. It can be achieved by replacing manual practices with ERP practices (Samiei & Habibi, 2020). For instance, computerizing the admissions process allows you to carry all the activities online which include receiving and sorting application, generating and display of merit list and subsequent notifications to the concerned persons, etc. All activities in an HEI must focus on dispensing with manual paperwork, minimize amount of time and increase the productivity. Digitalization of the whole institution is one of the most significant, positive and affirmative aspects of globally distinct and successful universities/HEIs.

Growth is a necessary element and so is the continuous improvement. Progress is associated with the awareness and implementation of latest Edu-tech to maximize student progress and optimum engagement of faculty and team. Smart data management is absolutely necessary. Analytic tools and higher education ERP helps in taking effective, timely and smart decisions. Proper data management always helps in bringing out changes and to find out what works the best. At the same time, security of data is equally important, incorporating role-based access to key data. It is important to promote e-learning aggressively, but one should also think about those who not are privileged enough to have full-time access to digital devices. Such students must be treated with compassion and should be given ample amount of time to complete their tasks. Digital equality is very important, and there must be a space for every kind of learner. An HEI will never be truly progressive until every student and faculty have equal learning, growing and exploring opportunities, so efforts should be directed to reduce the gap between the digitally privileged and the underprivileged.

Innovations in Collaboration Process

Indian philosophy always advocated for the entire whole world is a single family. Despite demographic variations, the objective of all the educational institutions is to find the truth and use the knowledge for the development of mankind. There are greater efforts on collaborative learning (Gachie, 2020; McDiarmid, 2020; Pearson et al. 2020), particularly with peer group. It has been widely recognized that students do not learn well when they are isolated "receivers" of knowledge. Peer review workshops, collaborative research assignments, group presentations, collaborative papers and discussion groups are important components of active learning. Peer collaboration develops a sense of audience and understanding the conventions of academic discourse, analysing writing and increasing the sense of mastery.

The beauty of collaborative learning is that it might be practiced in a number of ways. Collaborative exercises can be whole-class events; they might also be done in small groups. Some collaborative exercises work best with pairs, those exercises that require close attention. A student will learn to summarize the argument, predict the argument, ask questions, reflect what the writer is trying to say, label problems and make suggestions. Michigan State University and 14 others collaborated on research. The outcome of

this collaboration in the words of Barbara McFadden Allen, "Together, our universities continue to refine what is arguably the most effective means for collaboration", and in the process, our output increased tremendously both in education and research, apart from increase in our library resources, scientific equipment, number of students awarded graduation and PhD degrees, and a meaningful saving of 5.8 million dollars. Big 10 academic alliance, consisting of 10 big university of the USA, facilitates their students to study courses at any university for their graduation—online or on campus. Lauren Robel, executive vice president of this alliance, remarked, "Big Ten universities compete on the field, but until this fight is won, we are united in the critical research to battle this virus and united in the classroom".

(a). Plebeian Institution—A great institution always strives for its growth and helps in the growth of plebeian institutions of its area. The concept of university social responsibility (USR) has evolved during the past few decades. Aras and Crowther (2008, 2009) insisted that the central tenet of social responsibility is the essential requirement of civil society, and this is not limited to the present members of the society, but also to its future members and the whole environment. Alshuwaikhat and Abubakar (2008) inferred that universities should be responsible toward society and their stakeholders who provide resources such as capital, customers, employees, materials and legitimacy.

The United Nations (2015) has designed its 5-component blended sustainable development (SD) paradigm, (5Ps: People, Partnership, Peace, Planet and Prosperity), from which the goals of SD emerge. In early 2016, the implementation of SD goals of Plan 2030 has commenced, which was based on the recommendations of both the World Summit on Sustainable Development (2002), followed by the Summit on Millennium Development Objectives (2015). HEI has been subjected to a number of reforms processes; globalization for international acceptability; sustainability for long term survival; knowledge society for better understanding; innovation for value addition; and development of technologies and software for speed and time discount. Universities almost fulfil their responsibility of educating youth and developing research and innovations (Marti-Noguera 2016; Marti-Noguera et al. 2017; Razak et al. 2017). Howard and Sharma (2006) proposed "Third Mission" in which the HEIs will engage and connect with the society and the people. Universities should have shouldered its societal responsibility. It is a fact that HEI lack in the culture of SR and the commitment to ethics for development. While it is important to inculcate the values that make SR obligatory and binding to all, sustainable development agenda will help academic institutions on bringing fruitful development outcomes. The activation of the role of the USR in SD must be linked to strong implementation mechanism. HEIs/universities can easily achieve higher level of SR in a professional manner (Chatterson & Goddard, 2000; Nejati et al. 2011). It can be further facilitated if institutions own and implement their responsibility comprehensively with continuity.

Beginning with the student, his learning and skill training must be performed in the way that makes him an effective personage and a responsible citizen. For this, culture and awareness of SR can be developed by organizing large-scale campaigns, create positive attitudes for models of SR, allocate compulsory and optional courses of SR and linking them to practical field application. This should be supported by laying emphasis on the values of beneficence, placing social interests above personal interests, and observe the rights of future generations. For higher performance, it is very critical to provide incentives to the participating students of SR programs. Instead of putting influence on the students in carrying out their duties and responsibilities in education, academic research and community service, conducive environment is of vital importance to make the system self-deriving. The universities focus should be on attracting staff members, who are outstanding in the field of new disciplines (green) and enhancing moral values, work ethics, commitment, sense of belonging and sense of responsibility among faculty through meetings, workshops, etc. Conduct research and studies in the fields of USR and linking it with SD must be an essential component of academics in HEIs.

Finely, HEIs/university's commitment to its societal role necessitates the inclusion of SR in the university's vision or mission statements. University administration must extend institutional support to the SR by different ways and means, including SR within its objectives and strategic plans. All the activities, plans and programs must be green, or the methodology of implementation should be green in nature. There should be an inbuilt commitment to the development of educational curricula and extracurricular activities including sports. Continuous improvement should be ensured in the educational and skill level for the university outputs to suit the needs of the community. All kind of support be made available to specialized research studies and programs on SR and economic sustainability. Publication of SR outputs, findings and recommendations should be ensured. Minute and flexible indicators of SR on which the university depends should be specific and known to all the stakeholders. Measurement and achievements on SR should be focused on the objectives and strategic plans.

(b). Industry: The new dictum for HEI–PRI–Industries interaction (Joseph & Abraham, 2009; Mäkimattili et al. 2015) focuses on sharing knowledge, empowering one-another and bring innovation into all aspects, including management, teaching, research, manpower and profits.

Academicians in a university, researchers in public research institutions and leaders of industries, who want to drive change in their organizations, are required to design and showcase theory and best practice, and practical actions that you can take within your organization. This maxim will act as an engine of regional development, global prosperity and innovation. Today, the focus on individuals is ever more critical, as it is the front line staff that facilitates activate cooperation between business and universities.

UIIN project is designing a learning framework, educational materials and innovative training for university and business stakeholders. The University–City Action Lab project aims to strengthen the links between HEIs and the city stakeholders by having students solve city issues through a series of challenge projects in Paris, Barcelona, Porto and Ljubljana. It will do so by facilitating knowledge exchange and flow of resources, enhancing societal relevance of HEI curriculum via civic engagement, helping develop relevant skills among students, empowering universities in increasing their knowledge and practice in establishing urban partnerships and fostering adoption of city engagement models. The project will promote the engagement of universities with their immediate environment and strengthen their potential in fostering communiqué among regional population. This will help to start and continue with the joint actions towards building of smart and sustainable cities. To provide universities with resources and tools, a collection of 25 Good Practices in University–City collaboration and hands-on challenge-based learning activities have been identified to implement.

(c). R&D Centres: Public and industrial research institutions are engaged in R&D, which play important role in the innovations in industry as well as in the Governments' emerging areas of research. Energy, ocean, armaments, aeronautics and space research are the major focus of public research institutions (PRIs) and national research laboratories (NRLs). Universities and HEIs are also playing its part in the global research activities, but the focus is more on fundamental research. From a survey, it was observed that the industries are focusing on innovation and R&D increasingly as they have learned then need of these parameters to surviving the ocean of competitions. About 14% of the industries under survey have not made any investment in R&D. These establishments think that R&D is not essential for their business, and they see it too risky and expensive. Large proportion of industries who have invested money in R&D opined the solutions were beneficial to them in process development and earning more profits. Many of them attributed it the local perception which they were able to build with the stakeholders by inviting them to participate in the innovations. Most of industries were happy to share that R&D provided them creative and innovative ideas for the improvement in their business, but the element of novelty in the product/process had a very little value. Innovations in Indian industries were mainly done by the employees and the customers—the major sources of knowledge. There is a very fragile connect (Minguillo & Thelwall, 2015; Pogodaeva et al. 2015) between industries and HEI/PRI/NRLs. Recently, the large number of HEIs has taken initiative to establish incubation centres for start-ups, innovation laboratories for the industries who wish to explore new projects and the low-cost testing facilities. Most economies be it from the developed economies or from the developing economies, and the channels of linkages between industries and HEIs are formalized channels and open channels. A very few developed nations have adopted informal channels of linkages. The incidence of R&D interaction between different stakeholders is very low. In a survey of 462, only 11% claimed that they had any form of R&D collaboration with each other. However, those who have R&D interaction, the collaboration has been a success in achieving objectives. For about half a century, majority of the professors and scientists perceived that HEI/PRI/NRL/Industry interaction was very important, and the efforts of these professors substantially increased the extent of interaction for innovation.

Innovations in the R&D functioning of HEIs require a strong interaction. Students and faculty of HEIs must orient themselves to understand, analyse and provide solutions at low cost. Exchange of information and relevant information is very important for the success, as information from HEIs acts as a complement to the R&D efforts taken by the industry. It has been observed that the link between PRI/NRL and industries is much stronger in comparison with universities/HEIs. This perhaps is reflective of the nature of R&D taken up both these institutions. While research undertaken by PRIs is more commercial in nature, the universities research is considered more "basic" with lesser commercial value in it. Analysis showed that the industries that collaborated with HEIs achieved a higher level of innovation and value addition in the products.

(d). Policy Planner/Government: Functioning of HEIs is on the radar of all the governments across the world which affects its innovation and creativity. However, these liberty and authority have been provided to the researchers in the HEIs. LSE report on innovation in HEIs is adopted by several governments as a torch bearer to them. The main findings of this report propose that an HEI must cultivate an institutional culture to innovation that promote creativity, understand the benefits of the innovation, energize openness to innovation and lower resistance to transform. Incentives and rewards, new learning technologies, cross-institutional collaboration, improve student choice and quality, skills development of teaching staff are some of

the important parameters for innovation in HEIs. Above all, critical and periodic review of existing organizational boundaries and linkages is very crucial in promoting the process of innovation in an HEI. Asiedu et al. (2020) emphasized knowledge management capabilities, organizational learning and innovation performance in the context of higher education institutions (HEIs).

Policy planner of HEI must focus on the challenges resulted from globalization, dynamics of supply of and demand and resource generation for funding of higher education. These external challenges have to be addressed. On the basis of seven case studies, these challenges have been grouped in three themes.

i. Academic inputs—flexible curriculum, globally acceptable course content, student centric teaching, R&D and D&D inputs, ready-to-go to industry, capacity building for profitable enterprise and faculty centric learning
ii. Technology inputs—learning and usage of technology, methodology to enhance student performance and selection of appropriate technology.
iii. Global visibility—mini- and macro-teaching learning centres, multi-campus universities, virtual learning and skill development.

Innovations in Development Process

Development process of an HEI involves adoption, assimilation and value addition in its activities. Periodic redefining of goals, identification of new curricula and research activities, new management, products, services, and markets are important. Integration of industry, university and innovation is a powerful catalyst for job creation and economic development of all the key stakeholders. Innovation in development process of an HEI must focus on the following areas.

- Modernization of the students' preparation process in HEIs. It is necessary to train students and industry professional with state-of-the-art knowledge, innovative skills and exceptional competence that allow one to analyse and correctly measure the matter-of-fact situations and provide profitable solutions of the real problems of the business and modern enterprise.
- Creation and development of infrastructure for the successful implementation of new ideation, new projects and business plans. It should not only facilitate learning and skill development, and it should be capable of satisfying the desire and appetite of innovation and creativity within the learner and the teachers.
- Establishment and enlargement of small innovative enterprises (start-ups). New business, new strategies, cooperative market and ease of doing business should be facilitated. Government procedures, registration/patenting of idea, banking and finance, managing the market, implementation and expansion strategies should be easily available.

Further, integrated approach to the development of skills and competencies on a continuous basis be adopted by including,

a. Creation of organizational structures, platforms, laboratories, engineering workshops, contributing to the implementation of activities to build these skills and competencies;
b. Creation of innovative regional clusters. It must provide and facilitate favourable environment for developing regional innovation ecosystem.

Innovations in Value Creation Process

Knowledge has become a key resource globally, and better understanding of fundamentals either through research or through innovation can add value to the HEIs. Sánchez-Fernández et al. (2010) reviewed the relevant educational literature and observed that there is no empirically confirmed relational model of the value creation process that is commonly acceptable for either students, faculty or the HEIs. Development of intellectual capital of their citizens is very vital both for the governments and for the HEIs. The value creation and its prolongation are important for all HEIs, and it should be reflected in their policies and practices. Several models have been developed using the concepts of relationship marketing theory. Considering HEIs as service organizations, the value creation process is dependent on certain hypothesis. The students (customer) and their parents are influenced by the perceived value of an institution. This perceived value is dependent on the quality and intensity of the student–professor dialogue, the reliance on the educational institution, the university importance in public and student satisfaction. It has been confirmed that there is affirmative and distinct relationship between student perceived value, student satisfaction and student allegiance.

Both the actual value and the perceived value play an important role in the success. For an HEI/university, the difference in the perceived value and the actual value should be minimal. A student who is joining an HEI certainly has an idea about the perceived value. The actual value is what the university is actually worth without any expectations from the student. The perceived value is formed by the opinions of the market and by the benefits that a student expects to receive. The perceived value of an institution may be higher or lower depending upon the value creation process. The most important question is—how to enhance perceived and actual value? The students,

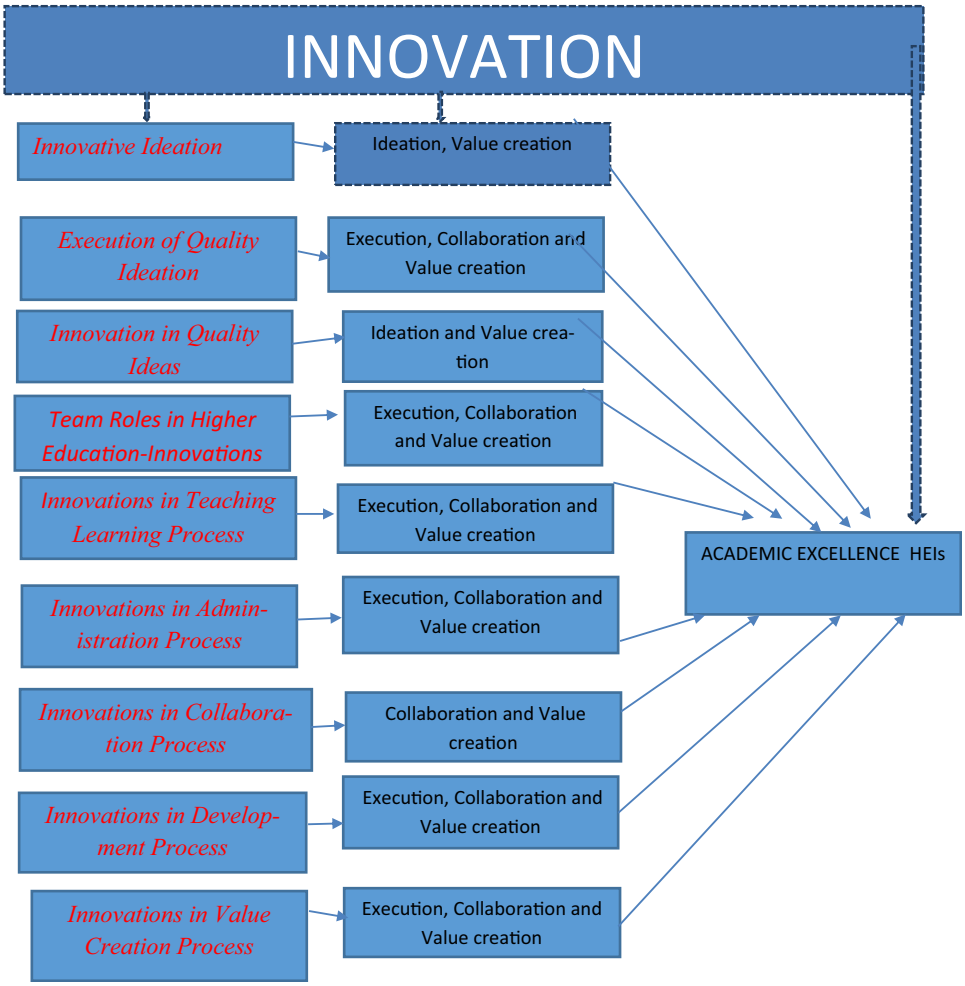

Fig. 1 Innovation framework for excellence in higher education institutions (HEIs)

the faculty and the staff are the builders of the perceived value of a HEI. Quality of teaching is the most important for a student. Infrastructure and management can add value to this. Perceived value can be enhanced publishing achievements of HEI regularly; by participating in ranking, evaluation and certification process and above all by performing social responsibilities—both towards people and to the peer/plebeian institutions. The satisfied and loyal students are the building blocks of value creation process. Improving interaction between students and professors could be useful to generate user identification with the organization, perceived value and loyalty. The universities should make meticulous effort and invest resources to reinforce links with students by organizing alumni meets, special lecture series, outreach programs, mentors meets and many more activities.

Conceptual Framework

The proposed conceptual innovation framework for excellence in HEIs based on ideation, execution, collaboration and value creation is proposed in Fig. 1.

The conceptual framework is driven by innovation let excellence of HEIs academic excellence cause by interaction of various elements, i.e. Innovative Ideation, Execution of Quality Ideation, Innovation in Quality Ideas, Team Roles in Higher Education-Innovations, Innovations in Teaching Learning Process, Innovations in Administration Process, Innovations in Collaboration Process, Innovations in Development Process and Innovations in Value Creation Process, which in turn affects organically to Execution, Collaboration and Value creation processes of HEIs leading to academic excellence in HEIs.

This conceptual framework also provides directions towards putting heavy emphasis on Execution, Collaboration and Value creation processes of HEIs.

Conclusions

Intrinsic motivation, autonomy and inherent diversity are the key elements of innovations which demands **flexibility** and out-of-box thinking in higher education and research. HEIs must exhibit it in its vision and mission statements, and process of innovation must focus on quality ideation and innovation in its execution through their vision and mission. While setting SMART goals is important, achieving it with value addition and value co-creation is still more important. Focus on teaching–learning process should not only be IT enabled or e-mediated but by live examples and hands on by design and process. Quality in patents, emphasis on green in research and enormous success in adaptation by the industry are the key elements for becoming innovative for HEIs.

Local and global collaboration both leading to value co-creation in teaching and research will be in high demand to become competitive and cost-effective through value co-creation and cooperative competition which demands very high degree of organizational flexibility (Sushil, 2017) but high degree of execution excellence (Sushil, 2009). It should not only be mere physical interaction maintaining their identities, but should also be extended to intimate organic bonding for the benefits of all stake holders in this process. Innovative HEIs may adopt multi-pronged collaborative approach. Value addition at each stage of innovation process, not only to enhance flexibility leading to *"Freedom of Choice"* of stakeholders but to enhance deep learning in value creation, must focus on GREEN—energy efficiency, environment friendly and sustainability. Finally, innovation is now becoming new assets of HEIs creating new processes leading to high value proposition offered by HEIs to students and industries, creating new models of higher education for global economies.

This paper being conceptual in nature lacks rigour of quantitative analysis, but at cognitive level, it needs more cyclic evolutions in future and quantitative validations.

This study contribute heavily on innovation by emphasizing on the fact that now *innovation* has become asset of *new normal,* having competence of embedding new processes leading to high value proposition to the HEIs system's stakeholder.

There is lack of research in the area of innovation led excellence in HEIs as only few researchers have talked about this, but this conceptual study and framework can be used as a tool to give a new concept to policy makers in the area of policy framing and management of Higher Education Institutitutions (HEIs), which is quite critical for any country to achieve excellence in this area resulting in new domains of knowledge and skills.

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Key Questions

1. What should be process of innovation forHigher Education Institutions (HEIs) to provide high vlaue propositions to its stake holder?
2. How innovation embedded frameworks of HEIs can help in creting robust eco-systems for them leading to excellence in academics and related activities pursued by HEIs?
3. Why Innovation this type of Frameworks for Excellence in Higher Education Institutions (HEI's) are very relevent and of importance in current 'Global Pandemic Scenario'?

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