# Research, Innovation and Knowledge Banking

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## Abstract

*The contribution of higher education in knowledge and technology advancement remains insignificant without the promotion of entrepreneurs through the business incubation of viable innovations of the prominent research scholars. Patenting the intellectual property in the present globalized world, is another challenge in this concern. As educators, our primary focus is catalyzing young researchers who experience innovative ideas. Research, however, has shown that the viable innovations should be converted into customized product/ service modules and that these in turn should be the point of departure. One way of establishing the incubators is a model of academia-industry partnership. Another aspect is banking the intellectual property to cope with the global knowledge economy. This paper analyzes business incubation initiatives, knowledge banking and conservation of intellectual property in higher education institutes through the sustained research infrastructure development. The ultimate implication of the paper is to enhance the research and innovation in higher education and to contribute in the development of country's knowledge economy.*

**Keywords**: Innovation, Business Incubation, Knowledge Banking, Intellectual Property

## Introduction

We are all engaged in the act of creating the future. One goal of higher education and research should be to equip faculties and young researchers to play a constructive role in shaping their future. Several global studies have shown that the existing approach is not sustainable. The present higher education must enable the transformations needed to achieve a better future. This involves new scientific understandings, enhanced technical capacity, improved social awareness and an ethical commitment. Our goal must be to enable researchers to engage in creative ways with the complex problems they face. In reality, the survival of human civilization depends on our success.

Teaching/ learning and research in higher education coexisted in symbiotic relationship from the past. Then the experts, young researchers and innovators come along. They take their viable innovative ideas in to consideration and apply them to the development of entrepreneurship and behold the economic development of the country. A paradigm shift in defining knowledge from the content 'what' to the process 'how' and the dawning of a brave new era - "knowledge economy" became the agenda of vision 2020.

Most of Nepalese graduates and degree holders are on the move to abroad in search of employment and try to reside there. They do not see any future prospects in the country to utilize their knowledge. As we know the fact that the main reasons behind this scenario are absence of employment opportunity, the lower industrial growth and the failure of existing

industries. Another reason could be our institutions only produce degrees and do not provide opportunities. The lack of continuous support to create sustainable growth oriented enterprise for providing employment, manufacturing competitive product and services requires **incubator service**. Business incubators provide individual need base support to uplift **innovative ideas** to convert to an **enterprise**. Academic institutions can play catalytic role to set-up and operate their own incubators so that they can produce **job givers not the job seekers**. In current scenario, the role of colleges and universities must be further extended to give a chance to convert the discoveries, the innovations made by their students to enterprises.

Nepal's primary objectives with respect to higher education are to develop a quality professional work force, and knowledge and technological base capable of supporting economic growth and promoting social inclusion. However, these objectives have remained rather challenging to attain because of several issues. Some of the key issues of higher education in Nepal as identified by second higher education project (IDA, 2007:3) included:

1. weak contributions of the sector in creating and adopting knowledge to support economic growth and social harmony,
2. poor quality and market relevance of education,
3. poor access for students from under-privileged households, especially girls, *Dalits,* and educationally disadvantaged *Janajati*,
4. deficient internal efficiency, particularly under public provision,
5. weak financial sustainability of the public academic institutions,
6. widening gap between the quality of public and private provisions resulting in segregation of students along income status,
7. negligible public funding for community campuses, and
8. inability of universities to focus on their core functions (p3).

Research and innovation based post-graduate programs were started in Nepal over four decades ago, but the contribution of universities in knowledge and technology advancement remained still insignificant. Two major factors contributing to this weakness are grossly inadequate research funding and poor recognition of research achievements for academic promotions (Nepal, 2006). To advance the quality of human resources of the faculty and students of universities and thus enable academic institutions in Nepal to participate in the global knowledge economy, it is critical to improve research and innovation outputs in academic institutions.

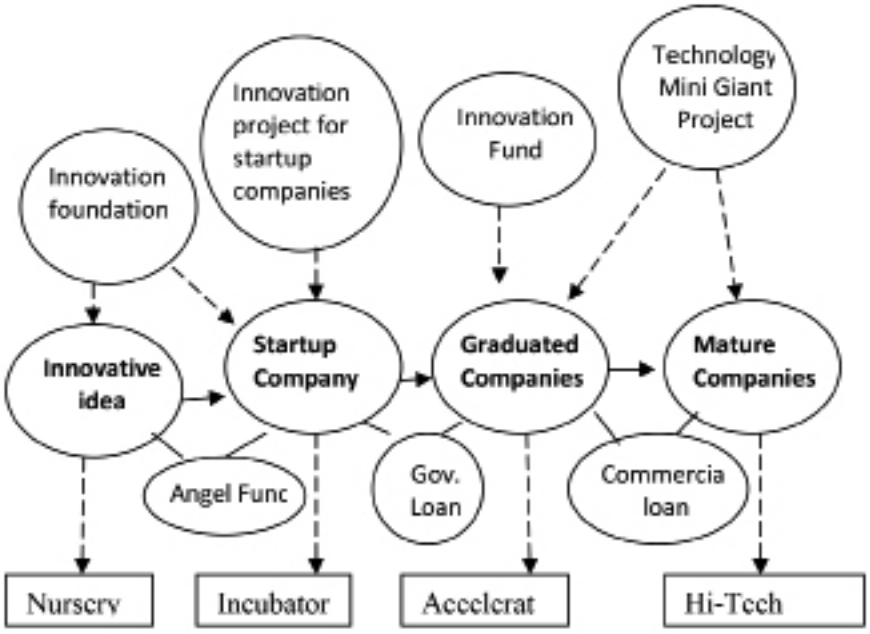
The public private partnership between academia and industry together with development partners may address the issues. **Business Incubation (BI)**, a process designed for social and economical development, would be a milestone for social and economic prosperity. It catalyses the process of starting and growing companies, providing entrepreneurs with the expertise, network and tools they need to make their business successful. Incubation programs diversify economies, commercialize technologies, create jobs and build wealth (NBIA, 2010). Nepal (2006) mentioned that business incubation helps government to generate jobs, income and support small companies while the universities and research centers can commercialize their discoveries, inventions and products. University graduates can be transformed into job creators from job seekers.

Universities and colleges are the premises for the incubation centers. The role of academic institute further extends to materialize the knowledge they have provided to their students. Development of **Business Incubation Centers** therefore, calls for a close coordination and mobilization of multitude of development partners in the government sector, private sector, colleges and universities, banking and financial institution and a combination of sponsors (Nepal, 2006). Therefore, set-up of incubation centers by academic institutions needs policy supports from government as well as they should be assisted from private sectors, banking and financial institutions.

## Philosophy behind the Business Incubation

The academic institutions are full of physical and knowledge resources i.e. professors, professionals, libraries, laboratories, land, building, etc. Incubator is a resource center to promote viable innovate ideas and convert them into sustainable enterprises. The academic institutions also have innovative ideas of their students which can be cashed into an enterprise. They can play their role as a job creator. BI has been recognized as a way of meeting a variety of economic and socio-economic policy needs like employment and wealth creation, support for small firms with high growth potential, transfer of technology, promoting innovation, enhancing links between universities, research institutions and the business community and industry cluster development (TBI, 2009). The figure below illustrates the road map of entrepreneurship.

**Figure 1: Road Map for Promoting Entrepreneurship**

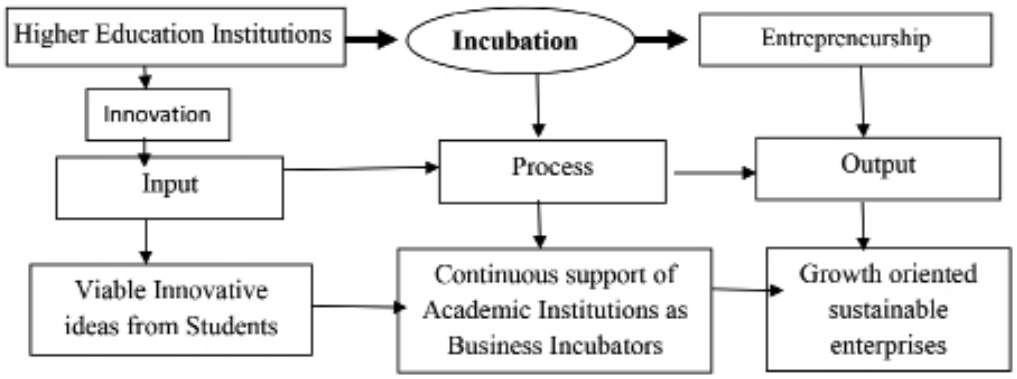



Source: Researcher's Illustration, 2014

The processes of entrepreneurship begin from innovative idea, starts up, graduated companies and finally grow up as mature companies. The angel fund influences the innovative idea at the beginning and helps for start ups. Hi-tech parks are the favorable environments for mature companies to groom.

The incubation process follows the process of input, process and output mechanism. The inputs of BI are small viable business ideas and start-up enterprises. The process of BI is to support entrepreneurs with expert advices and comprehensive business development assistances. Incubator can play a key role on mentoring, supervision, networking, trainings, providing office spaces, equipments and other facilities as required. The outcomes are graduated companies able to freely stand in the competitive market. This can be illustrated as the figure below:

Figure 2: Functioning of an Academic Incubator



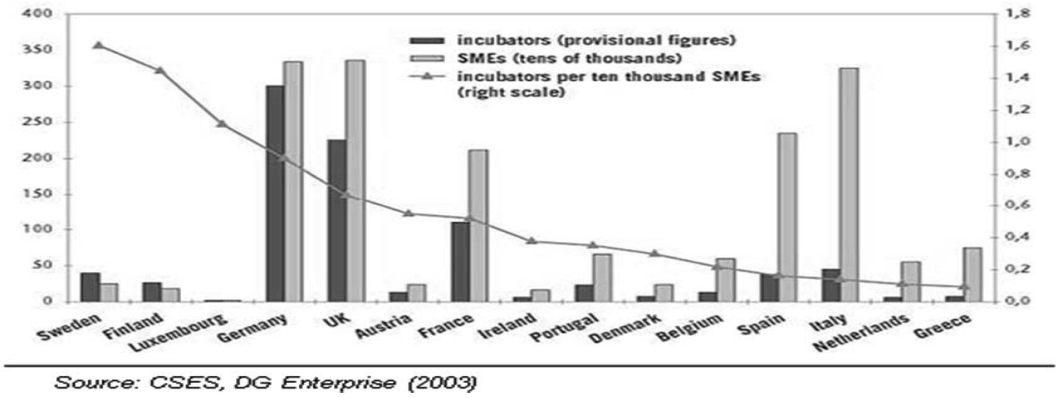

Source: Researcher's Illustration, 2014

Other outputs involve job creation, revitalization of community, commercialization of technology and wealth creation at national and local level.

## International Practice

The origins of business incubation idea can be traced to 1942, when Student Agencies Inc., Ithaca, began incubating student companies. In 1946, the first incubator outside the student community was created by American Research Development (ARD), started by several Alumni, to supply risk capital to entrepreneurs. They emerged as an economic development tool during 1980's initially in the USA and Europe. There are about 5,000 incubators spread around the world today out of which 1,000 in Asia (the half in China), 1,000 in North America, 950 in Europe and 400 in Latin America. Business Incubation centers are growing rapidly in the forms of innovation centers, techno poles/science parks, college and universities.

**Figure 3: Density of Business Incubators in Europe**




Source: TBI, 2009

The graph illustrated above shows that there are more incubation centres in Germany and UK. However, the Small and Medium sized Enterprises (SMEs) are more in Spain and in Italy despite of having less number of incubation centres (SIDA, 2008). There are approximately 150 Business Incubators in Canada today. Among them, 64% are in technology and 56% of Business Incubators are Urban located. They are providing full-time employment for nearly 7,200 people and generating annual revenues totaling more than $150,000,000. Company and job creation is the major output of these incubators in Canada (TBI, 2009).

South Korea started business incubation centre in 1991. The 330 Business incubators have been established there by 2005 out of which 226 were in universities (Cho, 2010).

**International Networked Business Incubation Centers** are located in China. Even there are 35 incubators in Shanghai with 600,000 $m^2$ incubation space and 2000 tenant companies as well as with 33,000 employments. Out of 18 incubators in Guangzhou, the third largest city of china, Guangzhou High-tech Incubation Center (GHTIC) has admitted altogether 51 employees, including 2 doctors, 8 postgraduates and 33 employees with college degree.

In India, the initiations in this matter have been taken by Department of Science & Technology, having more than 53 technological business incubations. The total investment on those TBIs is IRs. 100 crores and the cumulative revenue generated from them is IRs. 590 crores (SEBC, 2009). The survey data revealed that 71% were Technical institution/ University linked incubators. More than 80% of entrepreneurs in those incubators are less than 40 years of age and high 49% of them are below age 30. About 55% ventures have been set up by graduates whereas 37% ventures by post graduates and doctoral degree holders.

From the history, we can see that business incubation was initiated from college and students and still academic institutions are running so many incubation centres. Realizing the importance of business incubation to achieve the goal of industrial and economic growth of the country, academic institutions should start their own incubation centers to promote BI in the country for optimal utilization of knowledge of their students.

## Nepal's Initiation

Nepal was devoid of business incubation. The existing organizations providing entrepreneur development services are primarily engaged either in skill development or business development services that seem lacking of providing required motivation and follow up to the entrepreneurs. In 2007, Nepal Government, Ministry of Industry, Department of Cottage & Small Industries (DCSI) itself initiated to start business incubation program in Nepal. All the entrepreneurs from the first batch graduated in March 2010. BIP enrolled 7 new incubate companies for its second batch and currently running with 7 entrepreneurs of different industrial concepts (DCSI, BIP, 2010).

## Business Incubation Models: Many Faces Many Phases

Business Incubation programs can support the entrepreneurs and small enterprises by providing a proper ladder to technology-led start-ups as they move out of prototyping and into production. Like an incubator machine that provides essential temperature & environment to hatch, the incubation center supports persons having market viable innovative business ideas and lack of overall knowledge and resources to run the enterprise. The incubator company can also support entrepreneurs until they are able to handle their business themselves. Based on the objectives and nature of the clients, the following types of incubators are in practice today:

1. For-profit property development ventures,
2. Non-profit (economic) development corporations,
3. Academic institutions,
4. Venture capital firms, and
5. A hybrid of the above (NBIA, 2010).

Currently, the universities have their further role as incubators to provide a platform to their students to materialize their knowledge. The business incubation programs/centers provides onsite space, general services, management and marketing skills, mentoring and counseling services, financial resources etc. to new enterprises according to the entrepreneurs' need. Business Incubation Centres are providing the following services:

1. assuring space and on-site management to develop and orchestrate business,
2. training in relevant provision of business law, marketing, accounting and other management disciplines, and also in technical skills,
3. supporting and arranging in-house venture funds (startup seed money),
4. counseling for entire operational aspect of the incubatees' business, business planning, administration, regulatory and incentive programs,
5. integrating other business development services, marketing and networking,
6. sharing the facilities of fax, copy machines, meeting rooms, etc,
7. providing research facilities and networking with various laboratories,
8. graduating after a stipulated incubation period (usually 1-3 years), and
9. providing continuous assistance during post operation phase. (Nepal, 2006).

Universities and colleges can commercialize their discoveries through business incubation centers. To provide listed facilities, most of academic institutions already have almost all the infrastructures and equipments for their general set-up. They already have a strong pool of mentors and experts within the complex. In Conclusion, we see that any academic institutions can easily manage the most of the things to set-up an incubator.

## Concerns: The Emerging Issues

The major concerns about the incubation of innovative projects comes with intellectual property conservation, business house involvement for the partnership and collaboration, and knowledge banking for empowering knowledge navigation in higher education institutions.

## Intellectual Property Conservation

The economic impact of intellectual property, the role of intellectual property rights on **patents**, **trademarks**, industrial designs, **copyrights** and geographical indications in national economic development, and the importance of patent information and the impact of piracy and counterfeiting of protected works, and ways and means to combat that phenomenon are the major concerns of today's **business incubators**. They can also advocate various aspects of international negotiations in the field of intellectual property. General aspects of intellectual property in the world today includes World Intellectual Property Organization (WIPO), the specialized UN agency and its functions, WTO and its activities, especially as regards the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS Agreement), the legal enforcement and management aspects of the intellectual property system and public policy issues in relation to intellectual property rights and their implementation (SIDA, 2008).

## Business House Involvement: Partnership and Collaboration

Business incubation is new concept for Nepal. Fewer research and practices have been seen in this sector. Government and community/ private business sectors like universities, community colleges, private colleges, research centres, technical institutes, FNCCI, NGOs, INGOs, NRNs etc. have potential for partnership and collaboration in establishing technological business incubation centers in Nepal. The greater business community can be built upon social and professional networks.



## Knowledge Banking: Empowering Knowledge Navigation

Knowledge Economy is today's dominant area of economic growth of a country. In 1980, the estimated time for knowledge doubling was 30 years but now it has been in every 11 hours (Cho, 2010). The level of development of a country depends on what amount of investment goes on knowledge based industries. Knowledge navigation, transfer and Knowledge Banking can flourish the knowledge management system. This system requires knowledge tracking, documentation, data base management, and dissemination. The development of Knowledge Management Bank System Project can be an example that enhances effectiveness of business houses, and academia, knowledge banking, analyzes pattern of Nepalese researchers, and their priority areas, and facilitates global and local indigenous knowledge dissemination. Knowledge banking also empowers and sustains the products and service management in the society. We

should not worry about students going overseas. What was referred to as **Brain Drain** is now referred to as **Brain Gain (Bank).**

## Research Contribution in Incubation and Vice versa

Many projects from the Government, NGOs and INGOs are working throughout the nation for providing grants, research and initial start-up help to small enterprises, farmers and local people basically in the agricultural and handicraft sectors. Their work is quite appreciable for national development. Various research reports have indicated that the outcomes of their efforts are some small enterprises to support self employment. We can clearly see the lack of an environment to continuously assist innovative ideas to start an enterprise, mentoring, product development, search market and finance, branding, packaging and even follow up service after they reach in the stage of a sustainable growth oriented enterprise. The role of academic institutions as incubators to tap the innovative ideas of their students can be to:

1. contribute in strengthening teaching-learning by enhancing overall quality and relevance through the culture of research and innovation at higher level education in the country,
2. contribute for enhancing the human resource capacity in campuses, institutes/faculties, or departments to conduct relevant and quality research,
3. induce constructive paradigm shifts in national higher level education, from conventional theory-based teaching to emerging research and application-based teaching-learning,
4. establish university-industry relationships through frequent dialogues between the higher education institutions and industries, and
5. generate relevant knowledge and technology to contribute in the socio-economic development of the country.

## The Way Forward

Starting up a business is aimed for earning profit, growth and sustaining it. Researchers of an academic institution may have idea on new discoveries but may not know the techniques of materializing the innovative ideas. Similarly, students do not have proper resources to convert the idea into enterprise. The idea must grow with the help of experts' mentorship for continuous refinement of the idea to be converted into product or service and then placing them to the market. It further needs manufacturing of the product, and marketing of the service, setting the proper marketing channels and patent registration of the idea. Proper branding, trademark and packaging are important before selling the product in the market. Some seed fund during research and development period of the product or service is also important. The best place students are familiar for the incubation service is the institution where they study. Generally we know that an institution already has the resources to support the idea discovered by their students. In fact, the incubation center within the academic complex can create job giver and not the job seeker. The higher education institutions of Nepal can move in this direction.

## Concluding Remarks

It can be concluded that the role of academic and research institutions to promote business incubation in the country is inevitable. The transformation of innovative idea to an enterprise is optimally possible mainly through colleges and universities, as they are themselves a resource

centers of mentors, professionals, equipments, libraries and a wide network of similar other universities and colleges. We can feel that it is so late for us to take initiation in this sector in Nepal. We can hope for, though late beginning, and immediately work on establishing incubation centres.

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