

UNIVERSITY INDUSTRY COLLABORATION: OPPORTUNITIES AND CHALLENGES

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Abstract- Collaboration with industry is critical for academician to create scientific knowledge and industrial data. In turn, collaboration is critical for organizations in joint scientific research projects in order to develop solutions for production oriented problems. Both parties need to be in contact via collaboration with the aim of developing new data, methods and technology.. Within this context, there should be greater interest and interactions among industrialists and academicians, bureaucracy and government to enhance mutual collaboration and add value. The paper highlights the growth of industries and universities in the country and reviews the experience of industry university collaboration in some developing countries .It incorporates the scenario of industry university collaboration in Bangladesh, delineates its scopes and opportunities both from Industry and University points of view. Impediments standing in the way of collaboration have been identified and discussed. Key factors have been suggested for enhancing collaboration.

Keywords: Collaboration, Stakeholders, Connectivity, Opportunities, Challenges.

1. Introduction

Historically, University Industry (UI) collaboration in Bangladesh is almost nonexistent. Some sporadic efforts were made here and there in the past, but it did not take any shape. It has historical and cultural reasons. After independence, there were only five universities in the country two of which were technical and the rest general all being owned by the state. They were guided by strict rules and regulations and operated with noble missions of imparting education and awarding degrees. Industry was also in a very nascent stage mostly owned by the public sector. The operation was conventional devoid of any R&D activities. Under this situation, there were little scopes of any UI contact not to speak of collaboration. Things are changing fast. The number of universities has significantly increased with Private Universities coming into the scene. The industrial base of the country has been widened with increasing contribution to GDP of the country. The policy and attitude of the university has changed and become more open and eager to share with the industry.

2. Industrial Development

There has been a phenomenal industrial development in Bangladesh over the last four decades. There were handful of industries in Bangladesh immediate after liberation mainly jute, textile, fertilizer and sugar al run by Public sectors. The contribution by industry to GDP was only 11% which has now grown to 28% the industries have grown in varieties and sizes. The private sector has played driving role in the rapid industrial growth of Bangladesh. The large and medium sized industries are dominating the industrial sector in terms of output and employment [1].The leading industries are Textiles (25%), food products (20%) and readymade garments (16%).During the last 10 years up to 2011, there has been growth of manufacturing industries in terms of establishments, employment, output and value added as shown in the following table .

Period	No of establishments	Total Persons engaged	Gross Output (million Tk)	Gross Value added (million Tk)
2001-2002	27971	2465697	901937	290911

2005-2006	34710	3705884	1912048	718239
2010-2011	42792	5015936	5394906	1562947

From the above Table it will be observed that the growth of industries over the last decades is phenomenon being 5.2% in terms of number of units, 10.34% in terms of employment, 49.81% in terms of output and 43.72% in terms of value addition. The government has a target of raising the contribution of Industry to GDP from the present level of 28% to 40% by 2021.

Though the statistics shows that that there has been significant development in the industrial sector the operational culture is still traditional. Machines and engineering services being purchased from abroad are being installed under supervision of foreigners, goods are being produced with the foreign knowhow, goods produced sold locally or being exported to earn revenue to pay the bills. R&D activity is still to get footing in the industries. Traditional operation does not create any urge for any innovative idea in terms of energy efficiency, improvement of products or services, product diversification etc. As for example; RMG industry which is the main foreign currency earner has already reached the peak of its life cycle. Sliding cannot be checked unless programs of product diversification are started. This happened in case of jute industry which was once the main foreign exchange earner in the country. We ran the industry traditionally. There was no effort to create information for engineering of the project. There was no research to diversify the products. The result is known to us.

3. Development of Private University

The country has seen a rapid growth of Universities particularly the private universities in the country. The total no of universities in the country is now 130 of which 38 are in public sector and the rest are private. About 3 lack students are pursuing their studies in private universities which is more than 50% of the total students studying in public and private universities. The visions and roles of the University have significantly changed .It is no more valid that universities are sacrosanct investments free from critical analysis of cost effectiveness. The traditional outlook about the role of university was that it would import and distribute stored and created knowledge to the students to develop their faculties of body and mind together no matter if it is not relevant to their livelihood. Now the universities are being considered as factories of creating human capital. The days of thinking that higher education is to rouse thinking power in one more intensively and critically have gone. Now, education is being defined as something which refers[2] to the fitness of the university graduates to meet the needs of stakeholders (mainly employer) in terms of knowledge, skill, attitude and performance. The universities have to be more employment and job oriented. This has forced the universities to establish more contacts and relations to know their need which warrants more collaboration between industry and University. The students prefer those

universities which have close link with university for internship and better job opportunities.

4. University-Industry collaboration: Experience in some developing countries

In China, University-industry partnerships are very old which began as early as the 1950s. From the start of the Communist regime, universities were called upon to make full contributions toward the increase of production in China, as the Chinese economy was deemed to be in a state of "shortage." Transfer of knowledge from universities was conducted without explicit rules with respect to intellectual property. It was only after the major policy change that took place during the '1980s that China became more focused on the productivity of the economy and thus began to mobilize academic and scientific resources to achieve economic ends. The Decision on the Reform of Scientific and Technological Systems by the Central Committee of the Chinese Communist Party in 1985 marked this turning point in Chinese science and technology policy. This decision allowed universities to make their own decisions, based on the market situation, in organizing R&D programs and transferring technologies. The role of the government changed from direct intervention and control to guidance and oversight, setting laws and regulations under which universities could decide on their own course of action. The Republic of Korea presents another developmental model. To narrow the gap quickly with Japan and other industrialized countries, Korea began to recognize the importance of closer working relations between universities and businesses. The industrial sectors of strategic importance to Korea changed quickly from labor-intensive products to more high tech machinery and information sectors. In the recent past, a number of laws were introduced and amended to make way for a broader range of collaboration between universities and business[3]

The case of Singapore is different from any other Asian country. Having its origin as an entrepot, it has been open to international competition since its independence. By the 1990s, the country had already reached a high level of industrial development and its industrial strategy of utilizing cheap labor was no longer feasible. The need to move to an innovation driven economy was felt earlier than in its neighboring countries. Being the only two full-fledged universities up to the turn of the century, the National University of Singapore (NUS) and Nanyang Technological University (NTU) have had a strong tradition of collaborating with industry. Their graduates continue to find employment readily in the diverse manufacturing and service sectors. The culture of interaction with industry has been developed through a range of activities including internships, research collaboration, technology licensing, adjunct appointments and industry participation in consultative committees of academic departments.

In the Philippines a large proportion of economic activity is in the agricultural sector, which mainly serves its domestic market. Collaboration between university and industry is new and not yet widespread. A very small proportion of universities have strong R&D units that enable U-I collaboration. An in-depth study commissioned by a government agency acknowledges that several problem

areas existed with respect to research activities in Filipino universities, including administrative processes, lack of full time researchers and other resource shortages. What is noteworthy about the Philippines is that many of the firms operating in the country are subsidiaries of foreign firms or joint ventures. They generally lack confidence in the local laboratories and prefer to rely on technology supply from their parent companies, which lack knowledge on the research undertaken within Filipino universities. Nevertheless, during the past decade, there have been cases of industry contacting local research institutions and universities to resolve their technical problems. This was made possible partly as a result of the increasing expertise built up through the Engineering and Science Education Program (ESEP) and also brought about by the economic difficulty the country was experiencing.

After independence in 1947, Indian science and technology policy was integrated into the fabric of planned economy. A series of five-year plans set out the basic national strategies for economic growth and industrial development. Over the last ten years however, India moved gradually from a planned and closed economy to a more open and deregulated one, with new challenges being set forth for universities and industries policy. It is only in recent years that Indian industry has really started collaborative programs with universities. Although Indian success in competing in the global market has been modest in the manufacturing sectors, its success in the software sector is remarkable. The market share for India in the global IT service business is now 4.4 %. Major global IT companies have outsourced some part of their operations to India and have established R&D centers there as well. Indian IT engineers are working in many industrialized countries and contributing to the advancement of information technology. A few world-famous universities like Indian Institute of Technology have made this success possible. But overall, few Indian industries are supporting research projects within universities. Most of the collaboration is in the form of consultancies, which typically do not involve large-scale projects

In Thailand economic progress in the last decade has been remarkable, with a brief interruption at the time of the Asian financial crisis of 1997. Owing to a high level of foreign investment in the manufacturing sector, in particular, automobile and electronics machinery, Thailand is already a global hub for the production of parts and components in these industries. But Thailand's indigenous private sector is not very active in pursuing research. Only very large firms have their own laboratories. U-I collaboration has a limited history and there is still limited experience. There is no overarching framework underpinning such collaboration.

5. Scenario in Bangladesh

The scenario of University-Industry collaboration in Bangladesh is not encouraging. According to statistics disclosed in a Seminar held in Dhaka (The NEW AGE, March 28, 2016) an economics Professor of Dhaka University said that only 12 public and private Universities (Total No 130) had research collaboration with industries. He said only 183 of the 2563 teachers of these universities

were involved in such collaboration as they believed that lack of connectivity between university and industry, lack of research funding from the government and industries short term oriented research tendency were barriers to collaborative research. Presently, only 0.2 percent of the country's GDP are spent on research. Bangladesh University of Engineering and Technology (BUET) has created some kind of contact with outside organization through its BRTC (Bureau of Research Testing and Consultancy). However, BRTC is mostly limited to testing of materials and consultancy services to the clients on prescribed fees basis. The ingredient of collaborative research is not present. The government of Bangladesh wants to enhance support for university research as a part of its strategy for higher education (Strategic Plan 2006-2006). Supported by the Academic Innovation Fund (AIF) under the Higher Education Quality Enhancement Project (HEQEP), funded by World Bank Bangladesh Universities are now conducting advanced research on some of the most pressing economic challenges in key sectors of the country such as agriculture, environment and health. By fostering national and international research collaboration and modernization of research facilities and equipment in research centers, The AIF grants have helped to expand horizons for university research in Bangladesh. Bangladesh universities are now geared to work with partners to jointly explore new technologies for tailor made solutions. Under the project, Technology Transfer Office will be set up at every university to build connectivity and universities[4].

6. Opportunities

There are wide scopes of collaboration between university and industry for mutual benefits. The University is not only a store house of knowledge but also a factory of creation of knowledge. The industries are the appropriate areas where this knowledge may be applied for production of improved processes, products and services. On the other hand, in order to gain continuous competitive edge the industries need improved methods and technologies in its production process. The universities are producing graduates (Products) to be used mostly in industries and business meaning that universities are the producers and the industries are the customers. In order to improve the quality of products to be best fitted there justifies a scope for close linkages between Universities and Industry.

6.1. The scopes of collaboration from the point of view of the industry may include

- Access to human resources including motivated students and knowledgeable faculty
- Access to Lab and Library facilities of the University which are not available in the Company.
- Assistance in continuous education and training
- Obtaining professional expertise usually not found in the company for custom made solution to any specific problem
- Undertaking long term research
- Enhancing image value of the company

-Enhancing chance for industrialists to contribute to graduate and post graduate educational programs

6.2. The scopes of collaboration from the point of view of the University may include

-The working relationship with industry may widen access to jobs and internship opportunities for the would be graduates

-Industrially sponsored research provides students and faculty an exposure to real world research problems.

-Have access to materials and data necessary for bringing out quality research

-The researchers involved in industrial research give them a chance to prove practically of their theoretical and curiosity driven research in the industry which is a very highly driving factor for researchers

-Raises awareness and attentiveness of problems that industry confronts which helps in redesigning the curricula

-Provides new source of money for university whether for training or research.[5]

7. Factors hindering University Industry collaboration

Though there are wide scopes of collaboration between University and Industry, but in practice a very little is in existence. The barrier factors encountered in University Industry collaboration may be described from both university and industry points of view. The main reason is that there is no connectivity between University and Industry. The industry does not know what specific service they may get from University in the name of collaboration. The activities of University are not relevant to the industry or business. Can the scientific knowledge provided by University have the authority to solve industrial problem? Does the scientific knowledge support innovation process that stimulates development? Is it compatible with industry problem? Without possibility of application the knowledge is not used by industry. There is mismatch in terms of relevance, time horizons, objectives and expectations. The researchers in University are more interested to publish the results in the journal than applying the same to solving problems in the industry. University researchers are long term where as the industry wants short term solutions. Collaboration is costly and time consuming. Universities and industries speak in different languages.

From the University point of view, studies find that the barrier factors which hinder the process of collaboration between University and Industry include lack of interest from industrialists and academicians, insufficient publicity, lack of communication, remoteness of field studies, bureaucracy, ineffective legal regulation, lack of incentive, absence of any success story, lack of University and University communication centers etc.[6]

8. Enhancing University Industry collaboration

In both developed and developing countries, University Industry collaboration has been found to play important role

in organizational outcomes such as increased number of licenses and patents, innovation, successful R&Ds and consequently increased efficiency and economic performance. In these countries various policy measures have been taken and frame work has been built to accelerate the collaboration process. We are in nascent stage as far as the collaboration is concerned. It is a two way process and unless mutual benefits can be ensured pace of cooperation cannot be enhanced. It will take some more time before we can be turned into a knowledge based society. Based on study, some measures to increase University Industry collaboration.

8.1. Increase connectivity

There should be a regular University Industry communication system. Industry must know what industry is doing. A collaboration Office may be set up in the University which will liaison with Industry to invite them to Seminars, Workshop, Exhibition and other important programs of the University. Arrange more study visits and Internships for students which will increase interactions with industry.

8.2. Establishing Centers

Universities as an entrepreneurial institution should set up Research Centers, Centers of excellence, Technology Parks etc to demonstrate that it focused on research, consultancy, Training etc. These organizations are to be invigorated through activities to attract the attention of Industry. Some Private Universities have already moved in this direction. E.g. IUBAT University have set up CPRTC (Centre for Publication Research Training and Consultancy), Centre for Career Development by Daffodils University.

8.3. Strengthen Institutional Framework

Various studies show that in those countries where University industry collaboration has gained ground institutional framework like organizations, law, govt. intervention have played a pioneering role.

In the republic of Korea, various ministries of government are executing policies for connections between universities and industries. These are the Ministry of Education, Human Resources Development, Ministry of Commerce, Industry and Energy, Ministry of Science and Technology, Small and Medium Business Administration and the Korean Intellectual Property Office. These ministries are giving support of general University Industry cooperation and technology transfer. There is Industry-University Cooperation Foundation, Cooperative excellent universities support, Regional Technology Innovation Center (TIC), Techno Park (TP), Regional Research Center (RRC) University Technology Transfer Center are managed by these governments organizations. They are promoting policies of University Industry Cooperation. There are 4 laws specifying utilizing cooperation and research results of universities among them, such as the science and technology basic law, technology transfer law, the patent law and the law for industrial education promotion and cooperation boost[3].

It is obvious that such framework needs to be developed to accelerate the pace of cooperation.

8.4. Incentives

There should be incentive in the form of financial package to boost up the cooperation between University and Industry. The incentives for both academicians' industrialists. In many countries e.g. in Turkey, the government has enacted several laws legally defining the framework of collaboration to encourage more universities to develop collaborating projects with industry. The relevant regulations provide significant tax reductions for Industry taking collaborative projects for the industry. The Tax benefits are 1) Industries R&D staff and research staff are exempt from income tax 2) R&D operations cost is exempt from Corporation Tax 3) Profits of concerned industries are exempt from income tax. There should be incentives for academicians' engagement as well. Incentives in the form of money (income, rewards, and bonus) as well as recognition like promotion may be considered for the academicians.

Conclusion

9. Conclusion

Collaboration with industry is critical for academicians to create scientific knowledge and obtain industrial data. In turn, collaboration with universities is crucial for industries to develop solutions for production sourced problems. Both parties need to be in contact via collaborations with the aim of developing new data, methods and technology. To strengthen mutual collaborations and add value much more attention should be paid by both sides in this area. There should be greater interest from industrialists, academicians, bureaucracy and government. Joint projects, field studies, internship should get more attention in universities. Two way communications should be built between University and Industry and finally mutual publicity should be increased in this direction.

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