Industry-Academia Collaboration for Entrepreneurship Development in Bangladesh

September 2024

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September 2024

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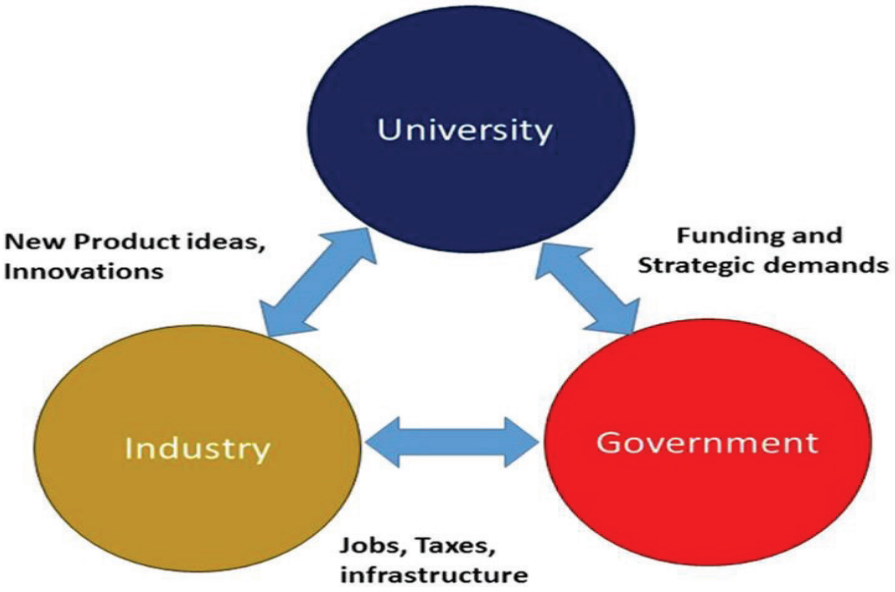
1. UNDERSTANDING INDUSTRY-ACADEMIA COLLABORATION

Industry-academia collaboration (IAC) refers to a mutually beneficial partnership or cooperation between universities, especially researchers and industries, to pursue a reciprocal interest in developing new goods/services or improving existing goods/services through innovation. It brings new prospects for research grants, real-world research problems and challenges, and new constituents in curricula development. Therefore, industry-academia collaboration is essential for innovation, technological advancement, entrepreneurship development, and the country's more comprehensive economic benefits. A qualified workforce with higher productivity is also the resultant outcome of such collaboration.

Industry-academia collaboration benefits both parties. On the one hand, the industry obtains skilled workers with practical training and specialized expertise. On the other hand, universities get the chance to work with the pertinent technologies, research the persisting challenges, and identify the way out. Therefore, industry-academia collaboration is instrumental to advancing research and knowledge and creating a skilled workforce with higher productivity. Both small and large-scale collaborations may take place involving varying numbers of academic institutions and industries.

Nowadays, industry-academia collaboration is governed by public policies contained in national government plans (Fernandez and Lima, 2013). Therefore, since the early 1980s, the connection between government, industry, and academic institutions has become broader, and thus, the interaction between these three parties has resulted in joint projects. In this regard, Etzkowitz (1998) proposes a model known as the "Triple Helix Model" in which government, university, and industry can interact and collaborate to carry out joint projects (Figure 1). This model conceptualizes government, university, and drive as 'intertwined spirals with different relations to each other in the classic innovation regimes' to foster economic and social development, as defined in the concepts 'knowledge economy' and 'knowledge society' (Leydesdorff, 2006; Galvao et al., 2019).

Figure 1: Initial strategic interactions of triple helix model in a middle-income country (push-pull)



2. BACKGROUND AND RATIONALE

Industry-academia collaborative relationship is now widely practised in developed countries and is increasingly important in many developing countries like Bangladesh. Through the exchange of knowledge between industry and academic institutions, industry-academia collaboration has now become a vehicle to enhance innovation. More specifically, it is becoming an important engine in entrepreneurship growth for developed and developing countries. Industry-university collaborations signify that it is an evolving trend for the advancement of knowledge and new technologies (Meng, Li, & Rong, 2018).

Industry partnerships open up new opportunities for students and faculties to receive additional funds to undertake research and diversify their research areas. The industry-university collaboration brings new prospects for real-world problems, research challenges, and new ingredients in curricula development. The collaboration also creates innovation and provides national economic benefits. But in the context of developing countries, some challenges need to be addressed for the cooperation between these two entities. These challenges can solve by creating a successful collaboration. This paper sets out the task of unveiling the dynamics of industry-academia knowledge transfer and analysing the collaboration framework.

Industry-academia collaborative education is an effective potential solution to the two complementary problems: practitioners in the industries find it difficult to access academic knowledge, and students studying at universities need more practical experience (Nakagawa et al., 2017). It highlights the importance to both developed and developing countries to bring together theoretical insights from universities and experimental 'know-how' from industries. Therefore, the amalgamation of theoretical insights and empirical know-how is essential to promote innovations, productivity, and entrepreneurship development.

Collaborations and knowledge exchange between academia and industry are essential to gain access to new knowledge and open innovation. The anecdotes at the firm level confirm a positive association between university-industry collaboration and innovativeness (Webster and Etzkowitz, 1991; Webster, 1994). Despite such importance, industry-university collaborative education still needs to be sufficiently studied in developing countries like Bangladesh to identify the gaps, formulate policies and undertake necessary actions to foster effective knowledge exchanges among the innovative actors in which universities and private companies are central. For this reason, developing countries are lagging behind developed countries in the practices of industry-academia collaboration. Bangladesh is not an exception to this case. The lack of such collaboration gives rise to skills gaps, typically in all parts of developing countries like Bangladesh.

Though industry-university collaboration has successfully implemented 'entrepreneurship education' in several universities in different countries, there is a lack of such collaboration for 'entrepreneurship education' in Bangladesh. It requires enhanced collaboration, particularly through project-based learning (Blumenfeld et al., 1991), to tackle a social, business, or technological problem jointly.

Realising the importance of the policy paper aims to explore recent trends and critical issues regarding industry-academia collaboration in Bangladesh based on critical reviews of secondary literature and the current relevant activities undertaken to enhance industry-academia collaboration. As literature and activities are scarce on industry-academia collaboration in Bangladesh, it is essential to identify the practical approach to experiential learning and entrepreneurship education based on global anecdotes and incorporate those into our relevant national policies. In short, Bangladesh needs more policy studies focusing on this specific issue of industry-academia collaboration. Hence, the objectives of the study are:

- To assess existing national policies and initiatives to understand the current scenario of industry-academia collaboration in Bangladesh.
- To explore literature that documents industry needs, gaps in policy implementation, and challenges to optimum industry-academia collaboration.
- To evaluate existing global policies and initiatives to compare and suggest measures to enhance industry-academia collaboration in Bangladesh.

3. RESEARCH CONTEXT

Bangladesh is a country with a labour force of 63.5 million, which is growing at a rate of 2.2% per year, and approximately 2 million new workers into the labour force each year. The graduate unemployment rate stands at 38.6%, a clear indication of a skill mismatch between the skills required for jobs and the skills earned from academia, implying that academia fails to provide skill orientation to their students studying at different universities in line with industry demand. More specifically, Bangladesh needs to catch up to other developing countries in developing market-driven skills. Therefore, collaboration between private firms and academic institutions is inevitable to keep pace with the change in ICTs and the fourth industrial revolution (4IR) and obtain excellent outcomes for both industries and academia.

As per the World Bank, over one-third of university graduates stay without jobs over the first two years after graduating, with one in three unemployed (World Bank, 2019) and among graduates of National Universities (which mostly provide tertiary education degrees), 66% remain unemployed (BIDS, 2019).

Soft skills, hard skills, and work experience are the three factors identified by employers as the main criteria during recruitment. Communication, time management, problem-solving, teamwork, leadership, critical thinking, etc., fall under the identified soft skills. In contrast, hard skills encompass computer literacy, technical knowledge, subject-specific expertise, language proficiency, business skills, etc. (CPD, 2021). According to data collected from employers, 46% of local private employers' state that applicants fail to meet the necessary set of skills, thereby leading to failure of job placement (CPD, 2021). Two primary concerns are the lack of professional experience and necessary qualifications (CDP, 2021). Again, in 2019, the World Bank reported that a shortage of applicants for highly skilled jobs, for instance, professionals, technicians, and managers, was claimed by 69% of employers (World Bank, 2019). While the lack of skills among graduates is heavily documented and empirically supported by various organizations, the problem must consider the role of institutions, private-public sector engagement, and stakeholder mobilisation.

One of the main factors behind the problem is industry-academia collaboration. Even though the Government of Bangladesh (GoB), the University Grants Commission (UGC), the Dhaka Chamber of Commerce and Industry (DCCI), and numerous other institutions have been working over the past few years, the skill mismatch is yet to see an effective reduction. While the government's 8th Five Year Plan (2021-2025) has set a goal of 11.3 million jobs, whether the graduates are skilled enough to participate successfully remains. The concern of employing 2.10 crore students who are currently within the secondary to higher education level (7% of them studying at vocational and technical institutes) requires a deeper understanding of whether the existing industry-academia collaboration frameworks are working optimally.

Both industry and academia require re-assessment and a re-visit to partnership design and collaboration to work towards reducing the skill mismatch of graduates. As per a study in 2018, a dire situation of industry-academia collaboration was recorded, with a mere 40% of employers and 65% of academic departments engaging in some collaboration (BIDS, 2018). The areas under collaboration were also considerably restricted to curriculum review & update, internship arrangements, workplace visits, professional networks with faculty, and new employee recruitment. There needed to be more emphasis on capacity building for student bodies, research undertaken by private institutions, and self-initiation of partnerships from the private sector (BIDS, 2018). We thus see how more investment is necessary to understand the challenges being faced and areas not being invested in enhancing industry-academia collaboration.

The policy paper, therefore, aims to assess the gaps within the industry-academia collaboration frameworks while also working towards creating more effective models of cooperation and partnership to meet the needs of both the labour force and the student bodies.

4. METHODOLOGY

This policy paper undertakes a desk review to collect, organize and synthesize information on the scenario of industry-academic collaboration. The study assesses the policies present, the implementation of said policies, and the effectiveness of the efforts being undertaken within Bangladesh. Policies and initiatives undertaken by the Government of Bangladesh (GoB) to enhance stakeholder cooperation and education quality are critically analyzed. Examples of the initiatives that are reviewed include National Education Policy 2010, Strategic Plan for Higher Education 2018–2030 (SPHE 2018–2030), The Higher Education Quality Enhancement Project (HEQEP), and other related policy frameworks, guidelines, and documents.

The assessment of such documents would help draw a comparison between objectives and actual outcomes resulting from such policies. Moreover, this study uses a literature review from a global context as a part of qualitative methodology involving researching, reading, analyzing, evaluating, and summarizing scholarly literature, including research reports, journal articles, research monographs, policy briefs, etc.

5. CURRENT SCENARIO OF INDUSTRY-ACADEMIA COLLABORATION IN BANGLADESH

Nowadays, existing academic curricula at universities rely heavily on memorizing style of learning, which promotes apathy, rather than fostering industry-oriented critical thinking. Moreover, the lack of adequate research engagements due to limited research grants at public funds (<1% of the annual budget in universities) limits the scope of further enhancement of curricula and innovation in line with industry demand. This is reflected in the Global Competitiveness Index 2019, where Bangladesh is ranked 117th position and 105th position in skills and innovation capacity, respectively, out of 141 countries. In 2020, Global Innovation Index ranked Bangladesh 116th out of 131 economies on overall innovation metrics, whereas India secured 48th position. Moreover, Bangladesh needs to catch up to our neighbouring countries such as Pakistan, Sri Lanka and Nepal.[1] This is because of the weak link persisting between industry and academia.

Weak links between academia and the production sector are the key challenges to Bangladesh's economic development. Though industry-academia collaboration can play an important role in economic and social development through a nation's innovation system, such collaboration in Bangladesh is conspicuous by its absence. Failure to create such collaboration is mainly caused by distrust among them and a lack of a facilitative environment.[2] Therefore, the number of quality research in a fundamental or innovative field has significantly decreased at tertiary educational institutions. More specifically, eight public and 13 private universities had no spending on research in 2020.[3] Moreover, though research activities play a crucial role in any country's intellectual and economic growth, most of the tertiary educational institutions in Bangladesh still need to be funded.

[1] See https://www.wipo.int/global_innovation_index/en/2020/

[2] See Momin, S. M. (2022). University-industry collaboration can boost research. The Business Post, 30 May 2022.

[3] https://www.tbsnews.net/bangladesh/education/universities-spend-only-1-research-183244

Altogether 125 public and private universities in Bangladesh spent, on average, 1.22 crore each on research activities in 2019, implying 1% of their total expenditure. In 2020, the University Grants Commission (UGC) reported that 142 public and private universities in Bangladesh spent an average of 1.26 crore each, a marginal increase over the year. Public universities, on average, spend 1.58% of their total budgets on research, which is higher than private universities, which spend 1.15% of their total spending on research (UGC, 2020). However, the reverse picture is evident if we consider Bangladesh's top 10 public and private universities. The top 10 private universities spent BDT 101 crore on research in 2020, whereas it is BDT 43 crore for the top 10 public universities. More importantly, only BRAC University spent BDT 55 crore in 2020, which was BDT 12 crore more than the total research fund of 10 public universities. Moreover, each public university, on average, spends 1.14% of its total budget on research, whereas it stands at 2.96% for private universities. It implies that more investment in research is required for public universities to keep them competitive with private universities.

Bangladesh ranked 120th position out of 154 countries in the Global Knowledge Index (GKI) 2021 because of the meagre spending on Research & Development (R&D). Of the seven sectors considered in measuring GKI, Bangladesh performed the worst in research, development and innovation with a score only 19.2 out of 100. Therefore, universities in Bangladesh need to be more capable of producing skilled human resources because of the lack of a handsome amount of investment in conducting research activities. Hands-on training for graduates in specific technologies is absent in most universities. Moreover, the lack of proper infrastructure, institutional research support and the fragile role of UGC are the underlying factors that contribute to such weak or absence of a relationship between industry and academia.

The University Grants Commission (UGC) of Bangladesh has recently undertaken a timely and well-thought-out initiative of establishing an industry-academia collaboration platform to improve and expand industry processes while generating a skillful workforce. In this regard, few academic institutions and industries in Bangladesh have participated in bilateral collaboration for development activities.

However, deals between industry and academia are only partially new in Bangladesh. For example, Samsung, a Global electronics brand, funded the two labs (i.e., Samsung Innovation Lab and Applied Machine Learning Lab) at Bangladesh University of Science and Technology (BUET) during 2013-2019. Earlier 2022, Huawei-BUET ICT Academy - a non-profit education programme was established under a collaboration between Huawei and BUET to train young learners with industry-fit skills through developing an ICT talent ecosystem. The Academy offers several certification programmes such as storage, routing and switching, 5G, artificial intelligence, intelligent computing, cloud computing, security, WLAN, and big data to provide three types of grade/skills certificates – associate, professional and expert – depending on their attainments. A local IT firm, Tiger IT, also established another lab at BUET. Moreover, Kazi Farms will build a convention centre at BUET.

Moreover, a contract between BRAC University and BSRM (the country's leading steel manufacturing company) is also an excellent example of industry-academia collaboration in Bangladesh, under which BSRM provides funds to BRAC University's School of Engineering to recruit world-class faculty, conduct innovative research and promote curriculum development. Under this collaboration, BRAC

university renamed its engineering school BSRM School of Engineering. Similarly, earlier in 2022, the Department of Biochemistry and Molecular Biology of the University of Dhaka and Janata Jute Mills took a joint initiative to research the method of jute retting to make it suitable for cultivation twice a year for increasing jute production. Intending to enhance industry-academia collaboration in the areas of research, innovation and skill development, Independent University, Bangladesh (IUB) has signed a memorandum of understanding (MoU) with the Metropolitan Chamber of Commerce and Industry (MCCI), Dhaka, which aims to introduce an internship programme at various organizations for at least 10 IUB students each year.[4] Institute of Business Administration (IBA) of the University of Dhaka is closely connected with the industry, and for this reason, industries prefer to hire IBA graduates. IBA sends their students to different industries and organizations for their assignments. Therefore, they learn how organizations and theories work, where the gap is, and how to minimize it, a blending of practical knowledge with theoretical knowledge. In addition to the collaboration mentioned above, local companies fund conferences organized by the universities.

Despite the recent funding pouring in from the businesses, more than such silo-type initiatives are needed to substantially impact the expansion of industries and skills enhancement among the students. Moreover, industry-academia collaboration is rare in the country, and the existing initiatives undertaken could be treated as a kind of CSR despite the discourse on the issue.

6. POLICIES HIGHLIGHTING INDUSTRY-ACADEMIA COLLABORATION

The review assesses the policies present, the implementation of said policies, and the effectiveness of the efforts being undertaken within Bangladesh. Policies and initiatives undertaken by the Government of Bangladesh (GoB) to enhance stakeholder cooperation and the quality of education are critically analysed. Examples of the initiatives that are reviewed include National Education Policy 2010, Strategic Plan for Higher Education 2018–2030 (SPHE 2018–2030), and the Higher Education Quality Enhancement Project (HEQEP). Such review would help identify the plan and activities to be undertaken to enhance industry-academia collaboration in Bangladesh.

6.1 Review of National Education Policy 2010

This review section highlights the important points regarding industry-academia collaboration pointed out in the National Educational Policy (NEP) 2010. It is evident in the NEP 2010 that the economic development of Bangladesh depends mainly on the contribution of industry, trade and service organizations. However, organizations require skilled human resources to generate such contributions. However, a weak or no relationship between industry and academia results in a lack of skilled workforce in Bangladesh. Therefore, the NEP 2010 highlights the importance of industry-academia collaboration for economic development in Bangladesh.

To reduce the gap between industry and university, the NEP 2010 proposes introducing compulsory short-term internships in the industry, trade and service sectors for graduate and post-graduate students to gain practical knowledge and experience. It also emphasizes developing educational

[4] See https://www.tbsnews.net/features/panorama/bridging-industry-academia-gap-through-collaboration 544090

institutions' curricula to keep pace with the rapid advancement of technology. In this regard, the education policy emphasizes new faculties of engineering universities be introduced with science and technology to produce proficient engineers and technologists demanded by the large industries like information technology, engineering, chemical industry, textiles, jute, leather, ceramic and gas sectors. Though this requires further financial aid, assurance of the supply of such funds from appropriate organizations is essential to implement such decisions. The policy regarding this issue has noted that industrial organizations need to be connected with the institutions offering engineering education. In addition, research on issues related to apprenticeship needs to be conducted.

Moreover, proper initiatives and research activities are to be undertaken to collaborate with engineering institutions and Chambers of Commerce and Industry to solve engineering problems in local industries. As a stakeholder, the government would provide necessary guidance to encourage engineering higher studies and research, and the University Grants Commission would undertake the onus of coordination, monitoring and financial assistance. In addition, regular updates of computer science and information technology teaching at the university level are essential to keep pace with the up-to-date technology and knowledge, and this needs to be disseminated among students by offering necessary training to build them up as skilled IT workforce.

It urges to pay more attention to the prospective export areas such as software, data processing, or call centre services industry, including the supply of skilled workforce in IT. Similarly, more attention is necessary to the research and post-graduate courses to develop the resources, solve different technical problems, and produce highly skilled engineers. NEP 2010 aims to create and strengthen textile engineering colleges and universities, technical teachers' colleges and leather Technology Colleges.

In-service training programs to train university teachers are also essential as such training would help them acquire the techniques and skills of teaching using modern technology. To bring this issue into reality, NEP 2010 proposes establishing an Information Technology University (ITU) to train teachers engaged in teaching at the university level and to facilitate necessary research activities in this relevant field.

It is necessary to incorporate the views of industries or business houses in designing curricula and course contents at the university level. Therefore, NEP 2010 gives importance to forming a joint committee comprising university teachers, industrialists and representatives of the managerial cadre. Moreover, arranging an institutional sharing meeting among different universities would help to identify their gaps and develop curricula. NEP 2010 encourages Public-Private Partnership (PPP) collaboration in case of establishing new technical and vocational institutes.

6.2 Review of Strategic Plan for Higher Education (SPHE) 2018–2030

The review of SPHE 2018-30 finds a need for coordination between the industry concerning employee skills and academic curricula. Although student internships have been on the rise over the years, and this helps students become familiarized with industry needs, teachers must also spend more time to get relevant skills for their students. From a broader perspective, it is not only

that the universities should build research collaboration with the industries but also it should build critical partnerships with one another, with the government, social development organizations, and also with the academic community abroad to build research as a core activity in the flagship university key partnerships. Moreover, it is reported in the SPHE 2018-2030 that the universities should always keep in touch with employers so that universities can adjust their curricula in line with the changing demand.

Despite the need to address a variety of existing and evolving issues affecting our economy, trade and commerce, agriculture, environment, health and nutrition, communication and infrastructure development and so on, the unsatisfactory research at the university level is due to the meagre budgetary allocation for research activities in Bangladesh. Moreover, it is mentioned in the SPHE 2018-2030 that overall research facilities at the universities could be better. More specifically, it highlights that university laboratories lack modem equipment and maintenance support, and industry-university collaboration in research has yet to occur. Therefore, it urges establishing a robust linkage and collaboration between industry and university to institute research arrangements for the commercialization of its outcomes. Public universities largely depend on the government's budgetary allocation for research. SPHE 2018-2030 focuses on university-industry collaboration to generate funds, particularly for research activities. Moreover, industry-university linkage could help conduct collaborative research, contract research, consultancy and the provision of ad-hoc advice and networking with practitioners to spawn additional funds for the university.

SPHE 2018-2030 emphasizes the composition of the senate and syndicate of public universities. It also emphasizes the balanced representation of all possible stakeholders, including teachers, alums, employees, industry, civil society, sponsors, students' unions and the government, to make them more transparent and participatory. A growing number of universities in Bangladesh offer undergraduate and graduate degrees in ICT-related subjects due to the global surge in ICT. Therefore, teachers and students need to keep track of the recent developments, trends, changes and prospects of ICT. Most importantly, it is very urgent to bridge the gap between industry and academia and proposes a number of initiatives to be undertaken, such as setting up advanced e-learning and distance learning facilities and virtual classrooms, carrying out unified curriculum development, updating facilities for ICT based pedagogical development and enable ICT program application in teaching and learning.

In addition, UGC should carry out sporadic research to determine the demand for human resources and review university curricula as per demand. Ministry of Education (MoE) would fund the universities to widen training, seminar and other research and development activities. Simultaneously, universities should start building their resource base from a number of activities such as intellectual property sales, consultancy or any other service offer, technology transfer to industry and business entities, and research outcomes sharing. This would help reduce quality gaps across the universities in Bangladesh.

6.3 Review of Higher Education Quality Enhancement Project (HEQEP)

Due to the persistence of deeply rooted and intertwined challenges at the higher educational institutions in Bangladesh, the Government of Bangladesh prepared the Higher Education

Strategic Plan 2006–2026 to ensure the participation of both public and private universities and representatives from think tanks and the private sectors. The Government promises to develop higher education, identifying challenges and recommendations for addressing challenges at both public and private universities. The Higher Education Quality Enhancement Project (HEQEP) aims to improve the quality of teaching-learning and research capabilities of the universities by encouraging both innovation and accountability and by enhancing the technical and institutional capacity of the higher education sector.

The evaluation of HEQEP reveals that under this project, a number of innovative activities over its life were accomplished, including providing inventors with foundational support and strengthening university-industry partnerships. The assessment of HEQEP suggested a way forward that would promote closer partnerships between universities, GoB, and the private sector. Academic innovation is the first component of HEQEP, and the objectives of this component are to enhance the quality and relevance of teaching-learning and research at the university levels and devise strategies for allocating additional public funds to universities with an emphasis on innovation and accountability. The second component, building institutional capacity, plans to strengthen the strategic and institutional capacity, including the strategic capability of UGC and strengthening universities' institutional capacity. The third component, 'connectivity capacity of the universities' aims to integrate universities into global knowledge. Establishing Bangladesh Research and Education Network (BdREN) and facilitating access to a worldwide repository of knowledge through subscription to a digital library are the main activities of this component. The final component is project management, which aims to ensure proper implementation, management, monitoring and evaluation.

Until 2013, the mechanism for university-industry collaboration did not exist. Industry- academia partnership needed to be improved under this initiative. However, the third round of the Academic Innovation Fund (AIF) included a new additional window named 'Innovation Fund' to support stronger university-industry links.

The project evaluation using the tracer study found a substantial need for industry-academia collaboration. Though less than half of surveyed employers maintain collaboration with universities, the sustainability of such collaboration seems a big challenge. However, most academic institutions mentioned maintaining some relationship with industries though there are variations in linkages between the public and private universities. The findings of the tracer study reveal that private universities maintain a more active role in the university-industry link than public universities. Moreover, variation in industry-academia linkage depends on the departments/faculties to which respondents belonged. From the university perspective, the collaboration included mainly reviewing and updating the curriculum, internship of their student, and workplace visits. From the industry perspective, the collaboration included professional networking with faculty and recruiting students for the industry.

The HEQEP contributed to the improvement of research quality through funding activities, and one of the 'game-changing' activities of the AIF was to promote university-industry collaboration. Through this activity, the industry provided technical knowledge and shared facility services, thus effectively promoting industry partnerships in universities and reducing the gap in industry-university linkage. At project closure, intermediate indicator five on the mechanism for university-industry

collaboration was piloted and evaluated, which finds that the university-industry collaboration is effective in developing products which were knowledge-creating, eco-friendly and beneficial for people.

7. INDUSTRY NEEDS, GAPS AND CHALLENGES TO OPTIMUM INDUSTRY-ACADEMIA COLLABORATION

A recent study by the Bangladesh Institute of Development Studies (BIDS) reports that the industries in Bangladesh operate with a 30% skills gap and only 3.65% of the total labour force participation in skills development training each year (BIDS, 2022).[5] The overall skills gap persists in the 15 important sectors in Bangladesh, including the agro-food industry, electronics, construction, light engineering, ICT, RMG, tourism, ship-building, leather and footwear, nursing, furniture, renewable energy, pharmaceuticals, jute, and plastic. The rate of such skills gap increases with the level of technological sophistication. A relatively lower skills gap is evident in the construction, light engineering, small-scale electronics and leather sectors. A moderate skills gap is found in the Agro-food processing and RMG sectors. A higher skills gap persists in ICT, ship-building, and the large-scale electronics sectors, and it is prevalent in senior-level positions, which require IT and sophisticated skills.

However, only 1.35% of the total labour force receives sector-specific training, implying that existing training modalities do not consider prevailing demand at the industry level. Gender disaggregation of training shows that 1.29% of the male labour force receives training and 1.48% of the female workforce. Despite the huge importance of the RMG and textile, construction and ship-building, less than 1% of the workers in that sector receive training per year. Moreover, many university graduates in Bangladesh remain unemployed due to a decline in productivity at the industry level.

The study also reveals that private industries and businesses need a more skilled labour force. Low skills and training result in lower productivity in Bangladesh compared to the average of other Asian countries. Firms in the private sector have no incentive to provide training on general skills; thus, the government should provide such training. The government should take initiatives to gain social recognition of technical and vocational education to increase the enrolment rate. In the 1970s, about 47.4% of our migrant workers were unskilled, which remains at 46.56%. Therefore, sending skilled people abroad would help boost expatriate income.

In this regard, the government has prioritized skills development and launched the Skills for Employment Investment Program (SEIP) in 2014. With this programme, the government provided training to more than 500,000 youths, of which over 350,000 trainees are employed at home and abroad. However, it is important to establish a fair wage in the labour market to match the training to the labour market wage. Low skills result in low productivity; thus, the industry faces a low-productivity trap similar to the middle-income trap. With the cooperation of the government and enterprises, university skills enhancement programs would help break the vicious cycle of low productivity.

[5] TBS (August, 2022). Industries face 30% skill gaps.

In the last few decades, the government of Bangladesh has undertaken different policies and initiatives to improve the quality of education and accommodate all the related stakeholders. These include National Education Policy 2010, Strategic Plan for Higher Education 2018–2030 (SPHE 2018–2030), The Higher Education Quality Enhancement Project (HEQEP), Guidelines for Different Programmes Under the Special Allocation for Science and Technology, Bangladesh Accreditation Council Act 2017, Leveraging ICT for Growth, Employment and Governance Project, Bangladesh Research and Education Network (BdREN), and Skills and Training Enhancement Project (STEP) etc.

Despite such initiatives, the skills gap persists at a high level, especially among university graduates. Therefore, a collaboration between industries and academic institutions has emerged as a new option to address the skills gap issue and improve competitiveness by generating qualified human resources and creating an enabling environment for innovation. The effective collaboration between industry-academy would help all stakeholders, such as students, faculties, industry, society, and our country itself, to get direct benefits.

Designing effective and obligatory collaboration requires removing existing bottlenecks within the existing structure of the universities and industries, hampering efficient collaboration between academia and industry. As resource constraint is the main barrier to developing and practicing industry-academia collaboration, incorporating the pathways of resource mobilization and encouraging the government to invest more in industry-academia collaboration would help improve the environment of industries and academic institutions. More importantly, these would help break the barriers of resource constraints and improve the quality of education, to innovate new products, contribute to Digital Bangladesh, and get the direct benefit of the demographic dividend. This research aims to provide some innovative suggestive measures that would help improve the industry-academia collaboration in Bangladesh, considering its cultural context.

The growing literature on cooperation between universities and industries finds the divergent attitudes between these entities, and this causes major obstacles to more productive collaborations (Styhre and Lind 2010; Abreu et al. 2016). To remove the barriers of the reluctance of industries to invest in industry-academia collaboration, the government of Bangladesh should come forward to establish the linkage. In this regard, the University Grants Commission (UGC) of Bangladesh may take serious initiatives as a lead, or the government might create a separate authority to lead the activities of industry-academia collaboration in Bangladesh. More specifically, the Bangladesh government may consider Malaysia as a case to establish a university-industry higher education collaboration council (UICC), which has the potential scope to promote communication between higher education, universities, and the private business sector through the joint engagement of the high-level representatives from the ministry of higher education, universities, and industry/ employer organizations.

Academic institutions and industries in Bangladesh are carrying out their activities on their terms without little or no coordination and collaboration. In addition, academia produces graduates or a workforce that the industry needs to engage in advancing their cause for the common good of all. Industry, on its part, can only produce or manufacture a little because they need more workforce to accommodate expansion. In addition, in most cases, the nation bears the consequential losses

that result from such a conundrum. Bangladesh's universities and industries are autonomous; thus, it is critical and challenging to activate industry-academia collaboration.

Moreover, Bangladesh is also facing a huge industry-level skill-gap due to fast changing technology. It is high time to introduce blended higher academic programs propelled by conventional theoretical teaching and practical industry- experience to address this and equip the human resources with appropriate up to date skills. This study urges establishing a University-Industry Higher Education Collaboration Council (UICC) to effectively implementation of such programs. If necessary, the Bangladesh government should revisit the existing higher education-related acts and laws and enact a new action to accommodate the same.

The transformation of the production sector and automation of old jobs due to the 4IR would disrupt the industries and job markets by eliminating many occupations, including low-skilled repetitive jobs, implying that Bangladesh needs to identify the skills gap and redesign t education system to remain competitive and innovative.

7.1 GAPS BETWEEN ACADEMIA AND INDUSTRY

Those working in academia and industries have different cultures and environments. This disconnect is the root of various problems, so it is important to understand the gaps between the two sectors to begin filling them. The following are some of the different gaps between academia and industry:

The curriculum of universities is not as per the industry standards

- Interns not getting a proper working environment in some companies
- Faculties lacking industrial exposure
- Grade-based process of evaluations
- Skills Gap, Performance Gap or Employability Gap
- Absence of industry-university interaction cells
- Unrealistic expectations of students from the industry
- Industry people should be more seriously involved in updating the curriculum of academics.

8. REVIEW OF EXISTING GLOBAL POLICIES AND INITIATIVES

Effective IAC has the potential of boosting the economy and transform Bangladesh's transforming the fortunes whilst ensuring growth. When educational institutions of higher learning and industries come together in a symbiotic working relationship, both will find common ground to meet the needs of each other and create a substantial and sustainable win-win situation for all.

Universities can undertake more initiatives in innovation considering their technology bases and engaging skillful and ambitious students in sophisticated problem-solving methods (Etzkowitz, 2004; Etzkowitz and Leydesdorff, 2000). Nowadays, the industry-government dyad is insufficient in realizing industrial innovation, and thus, a university-industry–government triad is needed to address the needs of today's knowledge society (Etzkowitz and Leydesdorff, 2000). This new

mandate explains the new role of the universities in industry and government to facilitate and encourage entrepreneurship development (Gibb, 1996; Ollila & Williams-Middleton, 2011). In the traditional management education system, learnings focus only on the hierarchical administration in an organization. Such education is inclined to foster risk-averting decision-making. Nowadays, students and practitioners are used to this administrative way of thinking. In contrast, entrepreneurship education develops skills and attributes among students to realize opportunities (Rasmussen & Sorheim, 2006). Thus, universities have started their entrepreneurship education programs undertaking a new and expanding role in innovation (Barr et al., 2009; Janssen et al., 2007; Meyer et al., 2011).

Dooley and Kirk (2007) consider university-industry collaboration an effective and well-suited instrument for entrepreneurship development through training. This is because, by nature, it combines the strengths of business entities with those of research and education institutions. In entrepreneurship education, opportunities for experiential learning are needed for learners to understand realistic approaches to innovation and to nourish and challenge their minds (Gibb, 1996). Ollila and Williams- Middleton (2011) desired to integrate conventional university education with a new experiential approach as they complement each other. This kind of integration encourages students to the problem- and solution-oriented thinking, which are beneficial in innovation activities.

Despite the limitation of research into university-industry collaboration for educational purposes, a few studies have explored how and why collaboration contributes to entrepreneurship training. For example, Cyert and Goodman (1997) used organizational learning theory to develop a basic framework for examining university-industry collaboration in education. Based on the findings, they claim that university-industry collaboration produces two-way benefits as both parties can learn from each other. The university can obtain methods and practices used in industry, and the industry can study the university's technology, and such interactions should be facilitated to enhance innovation. Therefore, the educational program should be designed to foster mutual learning between the university and the industry.

Boeing is one of the world's best manufacturers. It has long-term collaboration or agreements with the world's top research universities for research activities in specific critical technology areas to produce commercial aero planes, defense, space and security systems. Moreover, Procter and Gamble (P&G) is the world's largest consumer goods company, which works with the University of Cincinnati (UC) as its strategic academic partner. Such partnership is formed to advance product and process development by enhancing modelling and simulation capabilities. It is evident from the literature that the world's top-ranking universities can attract a lot of industry funding. Among the industries, the pharmaceutical industry is one of the most prominent investors in academia, followed by the growing IT industry.

9. CONCLUSION AND SUGGESTIVE MEASURES

Academia industry, and policymakers should step up and ensure to meet the needs of the 21st-century market in terms of human resources. All stakeholders have a role to play and should do so to provide better systems and structures for the common good.

Our country benefits immensely when academia, industry, and policymakers collaborate for a cause such as this. A partnership like that will ensure that academia gets to enrich its teaching and research, get financial support or funding for its projects, become a source for knowledge and empirical data, and graduates get job offers. Industry, on its part, benefits by sourcing the latest technological advances from new ideas, access to laboratory usage for research, partners for risk sharing for basic research, and recruitment made easy for the industry.

A conscious effort should be made by both parties and all other stakeholders involved to establish a partnership that focuses on this cause to ensure and promote collaboration between academia, industry, and policymakers. A partnership centre should be built where regular seminars or symposiums are held to discuss new ideas and innovations for advancement.

The industry should be deliberate about making inputs in the curriculum design and regularly contribute to reviewing it to reflect industry-required stands.

The approach used in assessing students should also be reviewed to reflect what the real working world needs.

University faculty should work on bridging the gap between theory and practice by visiting industry with students regularly. Also, university faculty should encourage student internships or bring projects from industry for students to have hands-on experience in research and grow through the process.

Bridging the industry-academia gap is decisive for this worthy cause, and the authorities should ensure the required resources to make it happens. By making headway with this initiative, we will, as a nation, produce students who are better prepared for the prospects and challenges ahead.

As Bangladesh aims to pursue higher and sustainable growth, it needs to increase the efficiency and productivity of resources, shifts to high-end garments, and upgrade technologies. All these require skills to deal with. More importantly, matching the fourth industrial revolution (4IR) requirement would require more skilled workers and professionals for Bangladesh's RMG industry to cope with future challenges that the industry would face in the context of apparel trends, fast fashion, and disruptive technologies.

The demand for skilled professionals, especially mid and high-level managers, is high, and this could be met with the support of all stakeholders. It implies that effective industry-university collaboration is imperative for developing mid and high-level managers with the knowledge and skills required to meet market and industry demand. In this regard, the Bangladesh government needs to continue supporting the RMG industry in addressing the skilled workforce issue to remain competitive in the post-LDC era.

The compulsion of internships is one good example of university-industry collaboration to bridge the gap. Other suggested measures in bridging the gap include regular market visits, industry visits, and class-taking by the industrialists.

Like Malaysia, Bangladesh may consider establishing a university-industry higher education collaboration council (UICC) potential to promote communication between higher education, universities, and the private sector and maximize university-industry partnerships. The council may comprise the representatives from the ministry of higher education, universities, and industry/¬employer organizations Revisiting existing higher education-related acts and laws in Bangladesh might be required, and if necessary, enacting a new act is advised to accommodate the same. In this regard, Bangladesh can follow the Bayh-Dole Act of the USA to set up a university-industry collaboration.

Last but not least, to unveil the existing scenarios of industry-academia collaboration in Bangladesh, it is essential to implement a mixed-method study for collecting quantitative and qualitative data from the pertinent stakeholders.

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Imprint

Publisher
Small and Medium Enterprise Foundation (SME Foundation)

Responsible
Small and Medium Enterprise Foundation (SME Foundation)

Contact/Order: bangladesh@fes.de
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Designed and Printing
SR Printing and Supply, Dhaka

ISBN: 978-984-36-0454-5

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