Labor Market Study for Skills (LMS- SEIP) – Ten Sectors under Component-3

EXECUTIVE SUMMARIES OF TEN SECTORS

1. AGRO-FOOD PROCESSING

The agro-processing industry is an important part in the manufacturing sector of Bangladesh. It works as a bridge between agriculture and the industrial process leading to the development of the country. While in terms of contribution to GDP, Bangladesh may no longer be called as an agrarian country, yet agriculture is the major provider of livelihood to around half of the population. Creating value addition to the agricultural products through agro-processing industries, may therefore be a key strategy for stimulating the development process and can play an important role in export diversification plan in future. Agro- processing industry is already identified in having a significant global impact on economic development and poverty reduction, in both urban and rural communities (da Silva et al., 2009). In the present study we have, however, only focused on agro processing industries that is under the manufacturing sector and thus enterprises that are related to food products and beverages are only included in the calculations.

The low level of skills and productivity of the Bangladeshi labor is endemic, as indicated by labor force survey data that more than 60% of the labor force has either no education (40%) or only up to primary level (23%). To improve this situation, Government adopted the National Education Policy (NEP) into 2010 followed by the National Skill Development Policy (NSDP) in 2011, to facilitate major education and training reforms. In 2014 the government of Bangladesh initiated the Skills for Employment Investment Program (SEIP), a multi-tranche financing facility supported by the Asian Development Bank (ADB) and Swiss Agency for Development and Cooperation (SDC), anchored in the National Skills Development Policy (NSDP), 2011. Under first and second Tranches, about 2, 23,000 people have been trained and certified, with a job placement rate of nearly 70 percent. The combined training target under the first two Tranches is set to 5,02,000. Female participation among trainees is more than 30 percent. In this backdrop, BIDS has conducted a study on the labor market in the Agro Food Processing sector for Skill for Employment Investment Project (SEIP) with the following objectives.

The main objective of assignment is to analyze labor supply and demand over the next 10-year period (2020-2030) in order to assist the government and the private industry to better plan the capacity and quality of skills training systems according to the evolving skills/trade/market demands from rapidly growing industry sectors.

The second objective of the assignment is to determine sector priorities, assess skills gap by sector, analyze sector-wise occupational composition of employment (including gender composition of employment), assess occupation-wise training requirement by sector and trade.

To fulfill the objectives of the study, both quantitative and qualitative primary data have been collected. It employed a variety of methodologies such as document review, questionnaire survey using structured questionnaire with concerned enterprises and employees and Key Informant Interview (KIIs) with government officials/leaders/representatives of associations and Focus Group Discussion (FGDS) have been conducted. For the questionnaire survey, a pre-tested (on December 2020) structured questionnaire has been used. Guideline/Checklist are developed for KIIs to obtain information like skill gap/shortage, Covid-19 impacts for the sector,

skill needs and labor demands, future projections for demand of labor, important suggestions for the development of the sector etc.

In this survey a Total of 117 agro food enterprises data are collected and also the data of 547 employees working in those enterprises are also collected to measure the skill-gap of this sector from both the demand and supply side perspective. In addition to this ten KIIs with association leaders/industrialists/authorities, one Focus Group Discussion (FGD) with BAPA and one FGD with BSFIC have been completed.

This study includes 117 agro processing enterprises which employ 41,546 employees in total. Survey result shows that overall output per enterprise in 2019 is 2348.47 million Taka and the export per enterprise is 59.86 million Taka. Hence, export to output ratio per enterprise is around 3%. It means that only 3 percent of the total output of the 117 agro processing enterprises are exported. The enterprises agreed that the current employees have skill gap. Moreover, it seems that higher skill gap exists for higher paid jobs like Managers and Professionals. The perception of enterprises about skill gap decreases for lower paid jobs like Elementary Occupations. Similarly, Service and sales workers, Craft and related trades workers and Plant and machine operators, and assemblers have an average of 6 percent responses saying yes to the current skill gap. The KIIs, FGDs and consultation of agro-food processing also corroborates with the survey results that there are a number of skill gaps in workers in different occupations in this sector. This sector has high potential for growth but this will require that the identified skill gaps and shortages are adequately addressed. Basically agricultural production, packaging, storage and transportations require some basic skills. Even few more skills are needed in future to address the automation of industries those have been identified by the leaders of three associations in this sector.

It seems SEIP trainings have gained popularity among the enterprises as the trainings are provided by BAPA and the leading Agro-food Industries like PRAN, IFAD, MEGHNA, WELL FOOD etc. provide trainings in this sector. Hence, 80.7 % (92) enterprises expressed that they are willing to send their workers in future to undertake trainings under SEIP Training Curriculum. On the other hand, although 90.52 % of the enterprises expressed that they would prefer to hire people having TVET training in their companies, however, only 19.66 % have hired apprentices trained from TVET in their factories.

Recommendations

1) Since, the enterprises emphasized that increasing training activities is the number one solution that they think can minimize the skill gap we asked them what types of trainings they need for the current occupations. Based on the responses we listed top 17 trainings that the agro processing enterprises think that their employees currently need. Among those trainings on Quality Assurance, Quality Control, GMP, GHP, HACCUP are on the priority list of enterprises.
2) Training and awareness of food preservation, specially maintaining the temperature need to be spread from the farmers, to suppliers (freezing van) to consumers.
3) For quality maintenance of the final product cold chain maintenance need to be ensured from growing till the products are supplied to consumers. However, the employees found that even the educated people they hire don't have sufficient knowledge of temperature control and preserving the output.
4) Even the farmers need to be trained up properly for the quality of the agricultural raw materials.

2. CONSTRUCTION

The construction sector of Bangladesh has expanded dramatically in recent years. The development of the construction industry plays an important role in the overall development of Bangladesh. In the government's 8th Five-Year Plan for fostering national economic development, the construction industry is recognized as one of the priority growth industries. The construction industry of the country has grown significantly during the last decade, accounting for approximately 8% of the total GDP (MoF, 2021). According to BBS (2020), the construction sector has shown promising growth over the last decade among the 15 important sectors that contribute to the country's GDP. The development of this sector has been aided by projects such as the Padma Multi-Purpose Bridge and the Dhaka Mass Rapid Transit Development. And the future growth of this sector will necessitate increased workforce productivity through skill development. And, to design particular strategies for skill development in the construction sector, a detailed assessment of the labour market and skill situation is required.

The main objective of this study is to explore the labour market and the overall skills gap in the construction sector. Besides, the specific objectives are: (i) to take stock of the overall demand and supply of skills in the construction sector, and how these demands and supply will change in the next 10 years; (ii) to measure various types of skill mismatch (i.e., skill gap, skill shortage, over and under-education, horizontal mismatch, etc.); (iii) to take stock of government policy and interventions to produce and upgrade the skills for the construction sector; and (iv) to assess the type of training programs required to meet the skill demand.

In determining the sample size of the establishment/firm survey, this study uses the methodology widely used by the World Bank in different surveys. Here, the population is the total number of firms/establishments involved with the Bangladesh Association of Construction Industry (BACI) and REHAB, which is 1118. BACI is involved in public construction as well as multi-storied building construction in Bangladesh. While REHAB works in promoting formal private sector Real Estate Development in Bangladesh. The estimated sample size of this study drawn from this population of 1118 firms is 108.

Further, under each of the sample firms, information has been collected from both the enterprises and the project levels including interviewing some selected employees as well. In addition, Focused Group Discussions (FGD) and Key Informants Interviews (KII) have been conducted to understand the workers' job conditions and future job aspirations in the sector and current conditions and future challenges and prospects of the sector.

According to Labour Force Survey (LFS) data, the construction sector is the second-largest generator of non-agricultural employment, trailing only the ready-made garments sector. Bangladesh's construction industry grew at an annual rate of roughly 8.69 percent in FY2006, but that rate dropped to 6.95 percent in FY2011, indicating a relatively downward trend throughout those years. Due to huge infrastructure investments and a rapid surge in housing demand, the situation began to shift in FY 2012 and jumped to 8.42 percent, after which it has remained stable at around 8 percent. It then rose to roughly 9.92 percent in FY 2018 and 10.25 percent in 2019, an all-time high in the construction industry since FY 2006.

Employment generating potential of the construction sector can hardly be over-emphasized. From 1999 to 2000, total construction sector employment was around 1.13 million which increased to 2.6 million in 2010. Which eventually stood at 2.4 million in 2016-17 and employment in the construction sector occupied 5.6 percent of the total employed population. And the wages of the construction workers are higher than that of agricultural employees on

average. This encourages potential workers to leave the agricultural sector and pursue skilled trades in the construction industry (BIDS, 2017).

But upon taking a closer look, the secondary literature paints a slightly different picture. The present scenario depicts that only 37.5% of the construction workers are skilled and 12.6% have advanced skills. Moreover, only 7.8% of the entire workforce are female workers in the construction industry and the majority of them are involved in low-skilled jobs and only are seen in a few occupations. And between 1976 and 2016, there were more than 10.45 million registered migrant workers, with over half of them classed as 'less-skilled', 15.2% as 'semi-skilled', and 32.5% as 'skilled'. Only 2% of the migrant workers were professionals. And to hone the skills of the workers, training is essential. But only 6.45 % of construction workers receive occupational training, while the remaining 93.55 % do not receive any work-related training. This untrained workforce could be detrimental to the construction project in a variety of ways.

It was found that the major challenges of this sector are: (i) major skills gap in the industry (ii) lack of knowledge about BNBC's standards and National Labour Law (iii) lack of knowledge about the standard using procedures of construction tools (iv) shortages in necessary working experience and training (v) absence of skilled trainers (vi) lack of minimal education needed for a successful construction project (vii) scarcity of skilled workers (viii) lack of stimulatory and supporting pay for the workers (ix) crisis of female workers' participation in the construction industry (x) increased demand for skilled and high skilled workers as opposed to current minimum competency levels.

This study further provides an overview of the features of the surveyed enterprises. The basic characteristics and structure of the construction enterprises/firms are reasonably uniform in Bangladesh. Construction enterprises handle together with a significant number of diverse small and large projects with varying collaborations. The large firms' performance is significantly impacted by their small supply chain partners' performance. Similarly, the small construction firm's activity also plays an instrumental role in the performance of large construction firms' supply chains. The successful management of these firms, however, is often plagued by their inherent characteristics. In particular, the problem arises due to lack of time and resources for innovation, excessive influence of owner-managers, difficulty in raising finances and maintaining adequate cash flows, failure of staff to demonstrate their capacity and capability, etc.

One of the striking characteristics of the enterprises is that in the senior management, engineering, and administrative positions, male holds over 95 percent of the positions dominating the females' position of only around 0.5 percent to 5 percent. However, at the lower rank levels, the scenario is even more biased with 100% of positions being held by male counterparts. Furthermore, at the senior management level, 94.5% preference has been given to male workers, which is also true for other positions like engineering and administrative. For the other occupations, there is a 100% biased towards employing male workers and no preference exists for employing female workers. Simultaneously, the average salary and other benefits of the male senior management, engineering employees, administrative employees, and support staff are much higher than that of the female employees holding the same job title.

In the existing labour categories of the construction sector, other than the employees for senior management and support staff, all the other ones seem to have a skill gap. All the manual labour employees have been reported to be unskilled. The skill gap is also very prominent among the engineers and administrative employees of the sector. There may be two broad reasons behind the existing skill gap: organization-specific or due to lack of training or

qualification of the employees. Simultaneously, there exists a skills shortage in the industry. Data however shows that the skill shortages are less problematic compared to the skill gap in the sector. The recruitment flows in the firms are good meaning that the occupation-wise vacancies are easily filled with the existing labour force in the construction industry.

Furthermore, due to the outbreak of the COVID-19 epidemic, much of the development accomplished in the construction industry over the years came undone. Initially, the enterprises were barely making any form of profit as a result of the work stoppage, and on the contrary, more losses were recorded during Covid time. Not only were the corporations losing money, but so were all of the suppliers that supplied the necessary supplies to the various enterprises for use in the construction sector. As a result, businesses have been unable to appropriately compensate their employees, and as a result, many workers have been laid off. That is, all areas of the construction sector encountered challenges during this time, and it will take a substantial length of time to properly recover from the uncertain situation that arose as a result of the epidemic.

Other than the challenges posed by the COVID-19 pandemic, alarming issues as found in the study are the increased price of construction materials, failure of the completion of the projects, lack of skilled workers and delay in repaying government and bank loans, and lack of technological knowledge, lack of manpower, lack of safety training, lack of necessary knowledge about safety rules and machinery, political interferences, financial default of contractor, the intervention of RAJUK, unavailability or high turnover of skilled labourers, unsettled labour conditions and appropriation of property or confiscation of private property cause impediments to the growth of the sector. Other challenges are forced bribery to various agencies, strife regarding properties, poor project planning, and control, sound pollution, traffic jam, narrow street lanes, etc.

Another important part of this study is the projection of labour and its changing demands. According to the surveyed employers, except for tillers and aluminum fitters, almost all labour categories will have a moderate increase in the near future. Following that, strong growth would prevail in the labour categories. There would be no such thing as extremely high or negative staff growth. Moderate and high-growth scenarios will become more prevalent for all construction industry employees. The same is true for newly introduced or relatively new in-demand jobs. These labour occupation categories are expected to grow at a moderate to a rapid rate.

Overall, it can be said that the contribution of this particular sector to GDP is significant and employs a large number of workers. However, the sector is still fully male-dominated. There also exists some skill shortages and significant skill gaps among the workers working in the sector. Data however shows that the skill shortages are less problematic compared to the skill gap in the sector. An overwhelming majority of the respondents identified the skill gap as one of the major impediments to the growth of the sector. Technological backwardness and lack of policy support from the government and delays in approval processes in various agencies have also been identified as other impediments. Thus, several recommendations come up as the solution to the challenges that are faced by the overall construction industry. These are:

- Formal education in colleges and universities must reorganize the needs of current times. To keep up with the demand, the teacher training curriculum should be revised regularly. And the gap between the educational system and the labour market should be reduced by a proper TVET system which must be easily accessible and free of

cost, relatively inexpensive for the majority, and relevant to labour demands. In this regard, the partnership between private organizations and government agencies is essential.

- Another important issue is that women, in particular, are under-educated and not trained. They need to be prioritized in certain trades of the construction industry and the government can provide programs accessible to them. The government should begin an investment program that will encourage skill training in a variety of industries.

- Also, other vocational skills are needed to diversify the construction sector, and internationally, such training is required to raise migrant workers' wages. Improvements in a variety of international languages, and computer abilities can boost skills and productivity by allowing the workforce to involve in various multifaceted jobs globally.

- Wage growth should also be in unison with rising labour productivity if job quality is to improve. Lower wages do not offer an incentive for workers to invest in technology, and as a result, future productivity growth may be hampered. Also, to address workforce shortages, providing competitive salaries and benefits, and cultivating a strong company culture should be established that encourages and rewards hard work and devotion.

3. ELECTRONICS

The electrical and electronics sector is considered as one of the most thriving sectors of the economy. This sector is regarded as the path to industrialization beyond RMG. While this sector has started exporting in recent times, this is mostly a domestic demand catering sector. The key to expansion of this sector lies in its capabilities to go beyond domestic market and achieve international standard. Hence technological up-gradation and up-skilling of the labor force can steer the country on the desired path of industrialization.

According to Bangladesh Investment Development Authority (BIDA), the size of the market for both industrial and consumer electronics was about USD 5.29 billion in 2019. The expected growth rate is about 15 percent per annum and consumer electronics sector (TV, refrigerator, AC, household appliances) is expected to grow faster than that of industrial capital goods (accumulators, transformers, etc.).

Against this backdrop, this report studies the level of skill of the workers in this sector, different types of skill mismatch, extent of training received by the workers, impact of skill gap and shortage on the enterprises, automation and job displacement, soft skill of the workers and the projection of workers demand by occupations for the electronics. We also study the impact of Covid-19 on the enterprises and the workers separately.

We begin by conceptualizing different types of skill mismatch, drawing on the current literature on skill. We distinguish between four types of skill mismatch – skill gap, skill shortage, horizontal mismatch and vertical mismatch. To the best of our knowledge, this type of analysis is new to the literature in Bangladesh. Our empirical works on skill mismatch follows from the conceptual framework detailed in the report.

We survey 100 electrical and electronics enterprises and 1340 workers. The novelty of the survey is that it is a worker linked enterprise survey – workers are drawn from the enterprises surveyed in a systematic way. We followed the sampling method of World Bank-Bangladesh Enterprise Survey (WBES) for representativeness. While we closely followed the structure of the questionnaire of Survey of Manufacturing Industries (SMI) of BBS and World Bank-Bangladesh

Enterprise Survey, we also take help of a number of internationally reputed surveys for skill such as the World Bank's Skills toward Employment and Productivity Survey (STEP).

Since electrical and electronics sector is a very heterogeneous sector, we also separate very large enterprises from others. This sample includes multiple factories of Walton, RFL, Minister, My One, and Symphony.

Major findings from the enterprise survey

First, we categorize the occupations in five major categories for better conceptualization – managers, professionals, sales and other service workers, technicians and associate professionals and craftsmen and plant workers, following Bangladesh Standard Classification of Occupations (BSCO). The floor workers (craftsmen and plant workers) dominate the distribution of occupations as out of 8701 workers in our sample enterprises, 6273 of them are craft and plant workers, which is about 72 percent of total employees. While there are 87 workers per enterprise on average, about 62 of them belong to this category. This industry is craftsmen heavy though not as much as the light engineering sector.

Second, like light engineering, electrical and electronics sector is also a male dominated sector – only 2 percent of the workers are female. Most of the workers are permanent workers – about 99 percent. The craft and plant works, who constitute about 72 percent of the total workers, receive about 8.63 thousand taka per month which is lower than the light engineering sector. Since this sector is more formal than the light engineering sector, the salary of the craftsmen was expected to be higher.

Third, this sector is moderately formal in the sense that about 57 percent of the workers have formal contract. This figure is 100 percent for the professionals. About one-third of the craftsmen have formal contracts.

Fourth, horizontal mismatch captures the discrepancy between the desired field of study by the employers and the actual field of study of the current workers. Overwhelmingly, there is no strong preference for field of study by the employers in the electrical and electronics sector, particularly for the craftsmen. None of the enterprises have any preferences for the subject studied by the craftsmen as their education level is very low. However, in the case of professionals, science background is sought by two-thirds of the enterprises. In reality, only 7 percent of the total workers are from science background. Note that horizontal mismatch is relevant only for the workers with higher education where they have a well-defined major of study. Hence, the extent of horizontal mismatch is low - about 11 percent. However, this mismatch is 28 percent for the large enterprises.

Fifth, the average desired level of education by the enterprises is only 6 years with about 3 years of education for the craftsmen. On the contrary actual level of education for all workers is 5.4 years on average. Though the level is low, there is not much discrepancy here between the desired level and actual level. This discrepancy is known as vertical mismatch. On average, we find 35 percent vertical mismatch for the full sample. However, vertical mismatch is higher for the smaller firms. There is another kind of vertical mismatch with respect to work experiences. The desired and actual level of experiences at the time of entry are 3.6 and 3.1 respectively on average. Hence, vertical mismatch with respect to experience is also low in this case.

Sixth, hard to fill vacancies are regarded as the skill shortage – enterprises have vacancies but cannot fill it them up due to lack of suitable candidates. At the time of the interview, about 10 posts per enterprise were vacant, largely driven by vacancies for crafts and plant workers. This indicates that skill shortage is large in this sector. About one-third enterprises opined that it took a month or more to fill up the vacancies. The figures by occupations indicate that craftsmen

were not very hard to find from the market though there are about 10 vacancies per enterprises. It may indicate the mismatch of quality of the workers.

Seventh, in order to understand the gap between the desired level and actual level of proficiency to perform a job by the workers, we asked the managers/owners to scale the level of proficiency of the workers on a 1-10 scale with higher number signifying higher proficiency. The average level of proficiency is 6.75 for all workers and the craft workers and machine operators have the lowest score – 6.36, compared to other occupations. Average level of skill gap is about 32 percent and this figure is the highest for the floor and plant workers (36 percent).

Eighth, overall impact of skill gap and skill shortage has been reported to be moderate. The enterprises reported that they would address the problem of skill gap and shortage by increasing the number of trainings and the salary of the workers to attract more skilled labor.

Ninth, the incidence of training received by the workers is extremely low. Only 3.83 percent of the workers received trainings in the last three years before the interview. Of the trainings, about two-thirds are conducted by external trainees outside factory premises.

Tenth, the industry-TVET linkages has been found to be very low. The share of workers with TVET linkage is only 1 percent of the total workers.

Eleventh, regarding automation and job displacement, we asked to scale the extent of automation a particular occupation may experience in the next 5 to 10 years on a 1-10 scale. On an average the score is 5.08. This indicates that the enterprises did not perceive automation as a threat to consider in the next 5 to 10 years.

Twelfth, regarding projection of occupations by 2030, the expected growth of the total workers is about 128 percent, with more than 12 percent annual growth. It appears that the longer term outlook is better, as projected by the firms. The highest growth is projected for professionals and sales personnel. Large firms are more optimistic about job growth compared to smaller firms.

Major findings from the worker survey

The major findings from the worker survey are the following.

First, formal education is an important ingredient for skill formation. Hence we discuss the level of education of the workers at length. We find that overall level of education of the workers is very low (8.57 years), including the managers and professionals. The craft workers and plant operators not only have lower level education, their results (GPA) are also worse than other occupation groups.

Second, only about one-third of the workers have passed HSC; About 10 percent workers have diploma degree; 6 percent have bachelor degree. Surprisingly, none of them graduated with science who have bachelor degrees.

Third, as we found in the enterprise survey, only 6.8 percent have ever attended any training in our worker sample. About 85 percent of the trainings were arranged and financed by the NGOs, private sector and government; the rest is arranged by the employers.

Fourth, there is a huge need for training particularly on basic and advanced trainings on electric circuits, electric wiring, sophisticated measurement techniques, CNC operation, cutting and fitting, precision welding, quality control, machine maintenance, etc.

Fifth, the floor workers such as craft workers and plant operators largely disagree that formal education helps in performance in their jobs. However, the managers and service and sales workers think formal education is important for their performance.

Seventh, using standard measures for eliciting five aspects of non-cognitive ability-extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, we find that the soft skills are more than the mid-point on a 1-15 scale. The workers also possess soft skills and they think these are also important for team work.

Major findings from the survey on the impact on COVID-19

Major findings from the module on the impact of COVID-19 on the enterprises and the works are the following.

First, we collect information for three quarters: January-March, April-June and July-September. Data show that the enterprises were largely closed during the period of first lock-down and output per enterprise dropped to about meagre 2.5 percent. This drop is even larger for the large enterprises. However, the employment was not impacted as hard as output as the firms tended to keep their workers during the lockdown and in the subsequent months. However, data on the third quarter – July-September 2020 show that the reduction in output was temporary as the small and medium firms bounced back very strongly compared to the pre-covid period; the pace of recovery of the large enterprises was much slower.

Second, we also interviewed the workers to assess the impact of COVID-19. Among all the occupations, the floor workers experienced the largest drop of full employment in April –June. We observe significant shifts in the nature of engagement from permanent to temporary positions. This is likely to be a cost-cutting strategy of the enterprise. However, the situation improved sharply from June and reached almost pre-Covid level in August. Salary of the workers almost halved in April and then gradually increased. About one-fourth of the craft and plant workers went back to villages during lockdown months. About 1 percent of them did not return to work even in September.

Key recommendations

This report offers three types of recommendations - general recommendations for the improvement of the skills of the workers, sector specific recommendations and the recommendations for designing the second phase of SEIP.

General recommendations

i.   Broader definition of skill is needed in national plan.
ii.   Ensure that skill acquisition is a life-long learning.
iii.   Clear understanding of how skill is formed is required.

iv.   Alignment of education and skill development policies with industrial policy and long term plans is required for a holistic approach of skill development.
v.   Sector Wide Approach (SWAp) for secondary education and TVET together
vi.   Informed Agent: Easily accessible information on skill development opportunities

vii.   Greater social recognition for vocational education is required.

viii.   Regular and high frequency data is required to track sector specific skills and skill mismatch.

Sector specific recommendations

i. Experiences of the large and reputed enterprises in electronics sector should be replicated for others in skilling up the technical personnel.
ii. An implementable framework for forging industry-TVET linkage for the electrical and electronics sector is required.
iii. A road map for embracing 4IR in the electrical and electronics sector is recommended.

Recommendations for SEIP for designing the second phase

i. Electrical and electronics sector should be a priority.
ii. Greater focus is needed on mid-level to advanced courses.
iii. Right combination of technical vs. management trainings has to be ensured.
iv. Soft skills for the workers should be included in the curricula.
v. Technical institutes should be the prime vehicle for delivery of training through strengthening the current institutes.
vi. Right combination of fresh trainees vs. on-job training needs to be ensured.
vii. Partnership with large individual industries should be fostered as they operate on the technological frontier in the country.
viii. Ranking of training institutions can ensure quality and help potential trainees make informed decisions.
ix. Offering scholarships, on top of tuition waiver, to the trainees can incentivize the potential students.
x. Demand side interventions such as mass campaign for popularizing the vocational education are needed to create demand.
xi. Partnering with international training institutions can ensure quality and accreditation.

4. HOSPITALITY AND TOURISM

The hospitality and tourism sector (HTS) is one of the 15 major sectors that are used to estimate the GDP of the country. This study attempts to analyze the HTS of Bangladesh from the following perspectives: (i) the structure and contribution of HTS under the current levels and nature of skills composition, (ii) skill gaps, and skill shortages, the mismatch between the actual and desired levels of education and experience, and recruitment difficulties in the HTS together with the proximate causes and consequences, (iii) the future levels of demand for each of the major occupations disaggregated by skill levels, and (iv) the impact of COVID-19 on the enterprises, and the adaptations used to cope with the 'new normal' style of operations.

A primary survey was conducted with enterprises and workers from 115 hotels and resorts (categorized from 5-star to 2-star) as well as 50 travel agencies (that are members of the Association of the Travel Agents of Bangladesh) and 28 tour operators (that are members of the Tour Operator Association of Bangladesh) from Chattogram, Cox's Bazar, Dhaka, and Sylhet. A total of 497 employees from these sample hotels and resorts, 46 from travel agencies, and 17 from tour operators were also interviewed.

Overview of the Sample Enterprises

About 84% of the hotels and resorts belong to private ownership. This percentage is even greater (more than 95%) for travel agencies and tour operators. The maximum number of workers in hotels and resorts are engaged in the production and serving of food and beverages, followed by housekeeping. The average number of employees is 42 while the median number of employees is only 24.

About 91-98% of hotels and resorts, and almost all of the travel agencies and tour operators provide different types of leaves entitled to the employees. However, many of these enterprises do not appear to provide paid maternity leaves to their female employees. The enterprises also provide various types of benefits including bonus, gratuity, provident fund, life insurance, health insurance, loan facilities, etc. It was found that 89% of hotels and resorts, 94% of travel agencies, and 96% of tour operators provided bonus in 2019; whereas this proportion has reduced to only 68%, 12%, and 7% respectively in 2020.

The average number of days operated across the quarters in 2019 was close to 90 (almost every day). But in 2020, the average number of days ranges between 70 and 80 days for all the sub-sectors during the first quarter (January–March) of the year. This proportion ranged between 0.63 and 35 days for hotels and resorts and almost zero throughout for travel agencies and tour operators in the second quarter of 2020. Test of difference between the average number of days operated in 2019 and 2020 suggest that there were significant differences between the number of days of being operational between the specified timeframe, thereby implying that the differences were not driven by mere chance.

Tests of difference in means reveal that sales revenue from goods and services across months in 2019 was persistently higher than that in the year 2020 due to the COVID-19 pandemic. Average sales revenues, for instance, of travel agencies in 2019 (January-December) ranged from Tk. 22 million to Tk. 28 million compared to Tk. 18 thousand to Tk. 16 million across January-December in 2020. The average production costs, especially operational costs, are higher in 2019 compared to 2020 in each quarter and there are significant differences between the two on a quarter-to-quarter basis. However, when gross and net operating surplus were estimated to elucidate the impact of COVID-19 on the tourism sector, it was found that the adverse impact of the COVID-19 pandemic was minimal during the first quarter of 2020 as the gross and net operating surplus of two (hotels and resorts and travel agencies) of the three sub-sectors were positive.

The average number of workers hired by the hotels and resorts was 6.63 in 2019, which is significantly higher than 4.98 as reported for 2020. In contrast, there was hardly any hiring by the travel agencies and tour operators either in 2019 or in 2020. Conversely, in the case of retrenching employees, hotels and resorts retrenched about 3 workers in 2019 compared to as many as 10 workers in 2020. The estimates show that per enterprise employment in the hotels and resorts increased by about 4 workers in 2019 but declined by about 5 workers in 2020.

Skill Compositions, Gaps, and Shortage

The study describes the existing skill gap perceived and the skill shortage experienced by employers of the enterprises. The employers of hotels and resorts perceived the level of different skills of their employees (each of the four departments) as "proficient". These findings are also evident when the analyses are carried out at the disaggregate level across different ranks. In contrast, the employers reported the level of skill of their employees at the time of joining as "neither proficient nor incompetent" across the four departments of all the four categories with star-ranks. The difference in the level of skills at present and at the time of joining implies that employees enhanced their efficiency and skills after joining their respective enterprises.

The employers in travel agencies perceive the level of skill of their employees as "proficient" and seem to be "satisfied" with the level of some skills of their employees (ability to work as Travel Advisor, passenger routing skills, etc.). In contrast, the employees are perceived as "somewhat proficient" when skills such as geographical knowledge, fluency in English in dealing with foreigners, etc. are considered. The employers in tour operators seem to be "somewhat satisfied" over the level of different skills of their employees at present. However, neither the

employers in the travel agencies nor those in the tour operators were much satisfied with the employees with no experience. The differences between the level of skill at present and at the time of joining imply that employees enhanced their efficiency and skill after joining their respective workplaces as found in the case of hotels and restaurants.

The Mismatch between Actual and Desired Level of Education and Experience

The actual level of education of employees in different departments within hotels and resorts varies between 10 to 13 years, while those in travel agencies and tour operators are about 14 years. Even though the magnitudes of difference between actual and desired levels are 'small', they are nevertheless significant. For the production of food and beverages as well as housekeeping, the actual level of education is about 1-year below what the employers desired. In contrast, the gaps are higher in the case of travel agencies and tour operators. It is found that employees have on average 3-4 years of experience in similar occupations across all the sub-sectors. However, the actual level of experience appears to be higher than the desired levels across all departments of hotels and resorts; only tour operators appear to be content with about 1-year of shortage of experience of their employees.

Existence of Skill Gaps and Effectiveness of Training in Mitigating Skill Gaps

The percentage of hotels and resorts stating the existence of skill gaps is lowest among 5-star hotels in each of the four departments. In contrast, hotels and resorts with 2-star rank stated about skill gap in food and beverage service (41%) and housekeeping (47%) while those with 3-star and 4-star ranks face skill gap substantially at food and beverage production. More than 50% of the hotels and resorts reported that skill gaps exist in all four departments due to a lack of training of employees. More than 55% of them reported that training will be "most effective" to mitigate skill gaps both in the production and services of food and beverage, housekeeping, and front office. About 47% of travel agencies and 10% of tour operators reported that "lack of training of employees" is the major reason behind the existing skill gaps. Almost all of these enterprises reported that training will be "most effective" to mitigate skill gaps.

Skill Shortage

About 98% of hotels and resorts reported unfilled vacancies in their enterprises. The average number of vacancies per enterprise was only one in the front office and housekeeping while on average two vacancies existed in food and beverage production and service. Similarly, 96% of travel agencies and tour operators reported unfilled vacancies, which vary between 2-3 posts.

For hotels and resorts "not enough applicants with required skill" came up as the major reason for "hard-to-fill-vacancies" across all the four departments. However, "not enough applicants with the work experience the enterprise demands" (front office and housekeeping only) and "not enough applicants with qualifications/right attitudes/motivations the enterprise demands" (food and beverage production and services) came up as the corresponding second reason.

"Inadequate supply of applicants with required skills and qualifications" came up as one of the major reasons for "hard-to-fill-vacancies" as reported by the majority (more than 40%) of travel agencies and tour operators. "Not enough supply of applicants with required attitude, motivation or personality" (30% of respondents) and "lack of work experience" (20% of respondents) have been reported as the other two main causes by travel agencies and tour operators.

Hard-to-Fill Vacancies

"Hard-to-fill vacancies" impede the process of introducing modern and new working practices in culinary, resulting in adverse effects in the "production and service of food and beverages" of hotels and resorts. In contrast, vacancies in housekeeping, front office, and food and beverage (service) result in revenue losses due to the reduced number of guests as reported by the

majority of enterprises. The majority of travel agencies and tour operators report that "hard-to-fill vacancies" lead to difficulties in maintaining the standard quality of service in the forms of "forgoing the provision of offering certain products to customers due to lack of workforce" and "facing difficulties in meeting certain customer service objectives owing to shortage of employees".

"Increasing salaries" and "increasing the skill level of the existing workforce through providing training" came up as the major two actions to mitigate the adverse effects of "hard-to-fill vacancies" as stated by employers of hotels and resorts. Increasing advertisements and redesigning the recruitment process came up as another suggested action by them. Similarly, "increasing the provision of training for employees" came up as the most effective action to fill up hard-to-fill vacancies, followed by "increasing salaries", as stated by the majority of travel agencies and tour operators.

Insights from Consultation with the Stakeholders

The panelists in the consultation workshop organized on 31st December 2020 at BIDS also echoed similar opinions about the existing scenario of skill gaps and skill shortage in this sector. They mentioned the "inertia of graduates to serve in the HTS", "existence of huge skill mismatch (graduating in this discipline and serving in another sector)" as the main reasons for the existing "shortage in worker supply" in this sector. This skill gap leads to the outsourcing of people from abroad at senior positions in this sector, especially in hotels and resorts.

The stakeholders lamented about the poor quality of training provided by academic and training Institutions. The current infrastructure in most colleges and universities providing training on hospitality and tourism management are not equipped in providing the facilities and scope to trainees to develop into professionals. The stakeholders stressed that the people with an interest to work in this sector also need to align their expectations. The bachelor's degree holders from public or private universities should accept the scope of starting their career at junior positions instead of searching for employment in higher positions with an "expected salary".

Projected Total Employment in the Sub-sectors

The projected number of enterprises for hotels and resorts came up as 1230, 1568, 1997 in the year 2025, 2030, and 2035 respectively. For tour operators, these counts stand as 641, 910, and 1292 in the year 2025, 2030, and 2035. Travel Agencies are expected to operate in 2025, 2030, 2035 with a total of 2385, 3115, 4069 enterprises whereas these numbers are 1355, 1819, 2442 for both travel agencies and tour operators.

The growth negative growth rates of workers employed in each sector/department by skill classification between 2019 and 2020 are predominantly due to the ongoing COVID-19 pandemic. Labor shedding comes up as an obvious outcome of the effect of the pandemic; workers at the high-skill occupation are affected less compared to the semi-skilled and unskilled workers in hotels and resorts, travel agencies, and tour operators. Interestingly, the agencies operating both as travel agents and tour operators did not register any labor-shedding on average at any skill level between 2019 and 2020. The estimates show that it would take on average 2 years for a hotel and resort, 4 years for a travel agency, and 3 years for a tour operator, to reach the employment level of 2019 from the current level.

The projection on labor demand reveals that demand for workforce in the hotels and resorts would grow by 34% in 2025, 89% by 2030, and 144% by 2035 compared to the level of 2019. The corresponding numbers for the travel agencies are 19%, 58%, and 97%. Compared to the 2019 level, the potential workforce in the enterprises operating both as travel agencies and tour operators may grow by 46% in 2025 and 104% in 2030.

Considering the projected growth rate of skilled and semi-skilled workers in the next 5-15 years, the areas of high potential for skilled workers are food and beverage production, food and beverage services, and housekeeping in the hotels and resorts. While the former two departments in hotels and resorts would observe an explosion for both skilled and semi-skilled workers, the latter would largely demand more semi-skilled workers.

Direct and Indirect Impacts of COVID-19 Pandemic

The HTS has severely been affected by the pandemic-induced economic recession that transpired through a fall in enterprise income and the concomitant rise in retrenchment and/or reduced working hours. Further, strict health warnings due to the high risk of exposure to infection from staying outside the home or traveling cause a reduced demand for tourism and vacation. In absence of any restriction on visits to tourist sites and attractions, the demand can still be depressed due to the health risks involved. The supply chain and logistics can be disrupted, as production, transportation, and distribution are affected in almost every sector of the economy. Despite the huge financial loss, many of the enterprises in the HTS are unable to go out of business due to the sizeable sunk costs involved. The financial distress would not be similar as firms are heterogeneous in terms of the scale of operation, capacity, efficiency, location, reputation, and resilience to shocks. The impacts have been analyzed from these perspectives.

Overall Business Situation of the Enterprises

Almost all the enterprises incurred huge financial losses. All of the travel agencies and tour operators, and 60% of the hotels and resorts expressed apprehension that they might have to sell their business if the pandemic situation prolongs. Even if they continue their business, operating at reduced capacity and laying off employees will possibly be the direction of adjustment in the future (50% of the hotels and resorts, 90% of the travel agencies, and all tour operators,). Given the precariousness, almost all enterprises reported that they would ask for financial assistance or loan to support the survival of their business.

Depressing Financial Situation

The total number of operating days for the hotels and resorts, travel agencies, and tour operators are 63%, 42%, and 45%, respectively compared to that in the pre-pandemic year. Total sales for the hotels and resorts, travel agencies, and tour operators are only 35%, 21%, and 13% of that reported in the pre-pandemic year. However, corresponding total expenses incurred by the three sub-sectors are also lower by 43%, 71%, and 86% during the pandemic year.

Reduced Room Booking and Fall in Room Tariffs

The room-booking counts exhibit a sharp decline by the second quarter when the country-wide strict lock-down was observed, a fall of 88% for rooms in the high-tariff range while 91-92% for rooms in the medium or low tariff range was noted. As expected, the revenue shrank by 90-94% compared to the similar season in the pre-pandemic year. The situation slightly improved by the third quarter, when the lock-down was partially lifted, but improved significantly by the last quarter, when the infection rate drastically fell across the country; 50% (low tariff range) to 61% (high tariff range) of the room-booking level recorded in pre-pandemic level is recovered by then.

Challenges to Operations during Pandemic

The hotels and resorts mentioned reduced demand for services (22%-42%), disrupted supply chain (8%-10%), and concern about employees' health safety (8.4%-23%) that appear to be major channels through which business operations were affected. In comparison, 64% and 86%

of the travel agencies and tour operators mentioned depressed demand due to lockdown and almost all the enterprises (91-100%) expressed concern about employee's health safety as the reason for reduced business.

Coping Mechanisms Adopted by the Enterprises

Initially, the majority of the enterprises were temporarily shut down in response to the pandemic shocks. The proportion of enterprises that went for complete shutdown exhibit a downward trend with the reduction in the stringency of lockdown. However, reduced salary payments appear to be a major coping strategy: 35% of the travel agencies during the July-August period while another 59% during the September-October period reduced salary payment for employees. Reduction of other non-salary benefits as a coping strategy is mainly played by the hotels and resorts, in the range of 16-18%. Comparing the average employment at base i.e., pre-COVID-19 counts of employees in March 2020, to that in the last quarter of 2020 suggests that the average laid-off is 9.7% in the hotels and resorts, 5.9%, and 16.5% in the travel agencies and tour operators, respectively.

Health Safety and Precautionary Measures

Although approximately all enterprises recommend workers to put on facemask at work, only 5% of employees in the hotels and resorts, 76.5% in travel agencies, and 2.2% in tour operations report it to be required or strictly followed in their workplace. Among the hotels and resort workers, 50% of the employees report inadequate provision of safe transport from home to work, another one-quarter report about inadequate hand wash facilities with soap at work and uncleanliness of washrooms, while approximately 42% report about using shared work equipment that may increase infection risks. Among the tour operators, 47% mentioned about lack of hand wash facilities at the workplace. Overall, the findings suggest that strict adoption of the practices inside the workplaces is weak.

5. INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

The development of human capital is an important prerequisite for the development of the ICT sector. With a demographic dividend in place, Bangladesh is in an advantageous position to exploit the potential of the IT industry. The sector employs roughly about 0.22 million IT professionals in 2020, which is expected to be doubled by 2025. To understand the IT labor market, existing skills, and skills gap, this study attempts to make an in-depth analysis of the skills gap in the sector. A survey of 146 firms and about 250 employees was conducted from December 2020 to March 2021 to understand the employment situation and skills gap in the ICT sector. We attempt to analyze the skills gap in a succinct manner to understand the dynamics of the labor market and future demand for skills in this sector that would be key for the growth and development of the ICT sector.

About 85% of the surveyed firms are involved in the software industry and 46% are involved with IT consultancy (Figure 2). About 33% of firms are involved with networking activities and 24% are engaged in internet service-providing activities. Only 14% are engaged in call center & BPO and the same proportion in hardware solutions. Survey results suggest that 60% are involved in website development and hosting, 52% in e-commerce, 47% in mobile applications, 42% in accounting and financial software development, 41% in education management systems, 36% in enterprise resource planning (ERP), 33% in POS/inventory management, 30% in graphics, about 25% are involved in hospital/insurance management system and a similar proportion in security and biometric system development. Less than 15% of the firms are

involved in banking applications and e-governance applications indicating a decrease in demand for software from these sectors. Average sales revenue growth for 2018 was 6% and for 2019 was 10% for the ICT firms. However, during the Covid-19 pandemic, sales revenue in several quarters in 2020 has been declining though in total the revenue in 2020 would not have declined substantially. The domestic market share is on average 76% and the foreign market share is the rest 24%.

Labor market, employment and wage

Our survey data shows that in 2019, on average 18.23 percent of employees in IT firms are Software developers, 12.42 percent are Administrative and Managerial employees, 10.12 percent are App developers, and about 11 percent are Technicians. In the case of ISP (Internet Service Provider) firms, the average percentage of technicians is very high (39 percent). On average about 11.72 percent of employees in Call center & BPO (Business Process Outsourcing) firms are as call center agents and 31 percent are Web developers and Graphic and multimedia designers. Compare to male employees the average number of females is very low. Overall, the male-female ratio of employees is 80:20 and for some of the occupations, such as applications developer, system administrator, website developers, the ratio is even lower. The average age of owner/director/shareholder is about 40 years and administrative managers are about 37 years for all types of firms.

Among permanent employees; Administrative and Managerial employees, Software developers (including mobile app. game developers, and Software Tester), and Quality Assurance Managers receive a relatively higher monthly salary (52, 59, and 46 thousand takas respectively). Data Scientist, IoT Professionals, Robotic Process Automation (RPA) Developer, Applications developers/programmers, Database designers, administrators and Systems administrators, and Computer network professionals have an average monthly salary of around forty thousand to fifty thousand takas. The average monthly salary of contractual employees is relatively lower than permanent employees, with Systems administrators and Computer network professionals having the highest average monthly salary of 26 thousand.

Skills shortage and skills gap

Skills gaps are determined by three aspects: (i) shortage of job-specific skills; (ii) skill shortfalls arising from faults in education; and (iii) skills mismatch—oversupply or undersupply caused by skill shortfalls and skill shortage.

On average, the percentage of a filled post mostly varies from 90 to 100. However, in the case of Call centers and BPO firms on average only 67 percent of Software developers (including mobile app. and game developers, and Software Tester) posts are filled which is the lowest among the three firm types, suggesting unavailability of such employees in the call centers and BPO sectors. In general, there is no big shortage of professionals in the IT sector. Occupation-specific shortages are evident. Around less than 5% of posts remained unfilled in the cases of web developer and graphic designer, software developer, and applications developer. Only call centers & BPO firms face difficulties in fulfilling the required positions.

On the other hand, over 60% of the professionals are reported as skilled or high skilled in e-commerce, e-governance, BPO, data entry, website, graphic, multimedia, ERP, and IoT. For hardware assembling and repairing, about 50% of employees are skilled/high-skilled and a similar proportion is available for internet services. Around 50% of the unskilled or semi-skilled employee was reported in the areas of GIS, BPO, Multimedia, AI, IoT, and Robotics. For the hardware sector, over 50% are unskilled or semi-skilled in assembling, repairing, and manufacturing. About 50% in call centers and 67% in ISPs fall in this category. The results indicate that the IT industry lacks adequate skilled manpower for some emerging areas of

activities, such as Robotics, AI, IoT, etc. It is observed that IoT professionals and Software Tester are not available in the market, and in all other occupations, they don't face difficulties to fill up vacancies for entry and intermediate level but reported difficulties to fill vacancies for senior-level. The availability of IT employees with a lack of skills for about 20 to 30 percent indicates a certain level of mismatch in skills and job preferences. Employees also identified that there is a gap in their educational qualifications and programming language skills indicating the need for training in programming languages.

Training and training demand

Among IT-related specialized training, Data Science, RPA Developer, Network and Security, and programming language were considered highly important. In 2019, a relatively higher number of employees participated in training on the programming language, design, front-end development, software tester (QA), Software tester (QC), business, marketing, and management, indicating higher demand for these training programs. Our survey data shows that enterprises also arrange training on FTTX (Fiber to the x), Ethical hacking and 3D design, and BPO-related works. Given the potential, by 2025, 80% of firms projected the demand for game developers, data scientists, IoT professionals, mobile app developers, software developers, applications developers, the system administrators will increase substantially.

The increased market demand for skilled laborers in the ICT sector raises the demand for a skilled workforce with more advanced training rather than semi-skilled labor with basic training. To mitigate the problem, industry stakeholders propose to combine elementary and advanced courses in one particular discipline. It is also proposed to provide training on both elementary and advanced courses of only one particular discipline/subject; rather than providing the scope of receiving training on only one course. High importance is placed on an effective industry-academia linkage. It is also recommended that only short-term courses may not be sufficient, instead, SEIP may invest in creating a center of excellence in the University's respective departments to ensure a sustainable supply of IT human capital. A few specific recommendations are also made in this report to make the existing training programs more effective.

6. LEATHER AND FOOTWEAR

In terms of export earning leather and leather goods consists of the second largest exporting sector of Bangladesh. Even Bangladesh government declares the leather products and footwear sector as one of the highest priority sectors. Leather industry in Bangladesh had undergone significant transformation during the past two decades from a low value addition tanning activity to a producer of leather footwear and leather goods along with high value-added crust and finished leather. Though availability of cheap raw materials, but export earnings of this sector is declining after 2015-16 because of environmental issue, international market price and skill gap of the labor.

The low level of skills and productivity of the Bangladeshi labor is endemic, as indicated by labor force survey data that more than 60% of the labor force has either no education (40%) or only up to primary level (23%). With the approval of the National Education Policy (NEP), 2010 and the National Skill Development Policy (NSDP), 2011, the government embarked on major education and training reforms. In 2014 the government of Bangladesh has initiated the Skills for Employment Investment Program (SEIP), a multi-tranche financing facility supported by the Asian Development Bank (ADB) and Swiss Agency for Development and Cooperation (SDC),

anchored in the National Skills Development Policy (NSDP), 2011. Under first and second Tranches, 223,000 have been trained and certified with a job placement rate of nearly 70 percent. The combined training target under the first two Tranches is 502,000. Female participation among trainees is more than 30 percent. In this backdrop, BIDS has conducted a study of the labor market in the Leather and Footwear sector for Skill for Employment Investment Project (SEIP) with the following objectives.

The main objective of the assignment is to analyze labor supply and demand over the next 10-year period (2020-2030) in order to assist the government and the private industry to better plan the capacity and quality of skills training systems according to the evolving skills/trade/market demands from rapidly growing industry sectors.

The second objective of the assignment is to determine sector priorities, assess skills gap by sector, analyze sector-wise occupational composition of employment (including gender composition of employment), assess occupation-wise training requirement by sector and trade.

To fulfill the objectives of the study, both quantitative and qualitative primary data have been collected. It employed a variety of methodologies such as document review, questionnaire survey using structured questionnaire with concerned enterprises and employees and Key Informant Interview (KIIs) with government officials/leaders/representatives of associations. For the questionnaire survey, a pre-tested (on December 2020) structured questionnaire has been used. Guideline/Checklist are developed for KIIs to obtain information like skill gap/shortage, Covid-19 impacts for the sector, skill needs and labor demands, future projections for demand of labor, important suggestions for the development of the sector etc.

Total of 93 enterprises survey and 902 employees survey from different categories and skill have been conducted from Leather and Footwear industries and also from Tanneries. In addition, eight KIIs have been conducted with association leaders/industrialists and one consultation meeting with industrialists or higher authorities has been completed.

Tannery plays a vital role in the value chain of leather and footwear industries. This study includes 38 Tannery enterprises which employ 2232 employees in total. It shows that overall output per enterprise in 2019 stands out 2574 (in Lac Taka) while the export per enterprise is 1545 (in Lac Taka). Hence, export to output ratio per enterprise is around 60%. It means that nearly 60% of the revenues in the Tannery industry of Bangladesh comes from the export earnings. Moreover, the capital-labor ratio per enterprise per employee stands at 7.44 (in Lac Taka).

This study also includes 55 Leather and Footwear enterprises which employ 14305 employees in total. It shows that overall output per enterprise in 2019 stands out 7764 (in Lac Taka) while the export per enterprise is 4873 (in Lac Taka). Hence, export to output ratio per enterprise is around 63%. It means that nearly two-thirds of the revenues in the leather industry of Bangladesh comes from the export earnings. Moreover, the capital-labor ratio per enterprise per employee stands at 1.70 (in Lac Taka).

Findings from the survey of Tannery and Leather & Footwear Industries indicate that there are a number of skill gaps in different occupations in this sector. The overall mean value (4.5) of the extent of difficulties in filling-up vacancies suggests that there exists skill shortage in the Tannery industry of Bangladesh. The Tannery sector is burdened with no skill and semi-skilled workers or this sector at present may experience economic downturn. Overall, the existing occupations in the Tannery industry are subject to lower extent of automation technology in next 5-10 years. It is expected that the Tannery industry in Bangladesh may demand labor for employment in the industry and this statement is corroborated by the views of enterprises who

view that overall, there will be 55% moderate growth and 6% high growth in labor demand in next 10 years. This sector has high potential for growth but this will require that the identified skill gaps and shortages are adequately addressed. Prevailing training facilities are not enough to meet the demand for skilled persons in this sector.

Overall, the Leather and Footwear industry will have a 30% employment growth in 2025 from current stage and the same figure rose to around 64% in 2030. It indicates an encouraging prospect of the leather industry of Bangladesh. Survey findings corroborate the idea that hard-to-fill vacancies arise due to the skill shortage that is why, it is suggested to impart training to the existing labor force involved in the leather industry. Moreover, the purview of training should be extended to such a level where the new comers in the market can as well avail of training facilities.

Recommendations

The following steps could be taken to encourage improvements in skill and production in Tannery and Leather & Footwear sector:

1. Training activity of practical work, more supervision of staff and more staff appraisals / performance reviews, training activity of practical work, and reallocating work appear to be the first three important actions for addressing the problem of skill gap in the Tannery and Leather & Footwear Industries in Bangladesh.
2. Need to establish more programs on Industry-led Apprenticeship.
3. CETP at the 'Savar Leather Industrial Park' needs to be functioning for achieving the target in the international market.

Specific Recommendation for Training in Tanneries

Trade/Occupation at BSCO 4-digit
1. Quality Controller Operator-Upskill, Training in new technology.
2. Drum helper- Upskill, Training in new technology.
3. Drum Man-New entrant
4. Machine operator- New entrant, Upskill and Training in new technology.
5. Mechanical engineer- New entrant, Upskill and Training in new technology.
6. Porter- New entrant, Upskill and Training in new technology.
7. Production in charge- Training in new technology.
8. Cutting operator- New entrant, Upskill and Training in new technology.
9. Splinting machine operator-Upskill.
10. Machine helper- New entrant, Upskill and Training in new technology
11. Flashing machine operator-Upskill.
12. Chemist- Upskill.

Specific Recommendation for Training in Leather and Footwear

Trade/Occupation at BSCO 4-digit
1. Supervisors and line leaders -Upskill, Training in new technology.
2. Lasting, Setting and Assembling Worker- Upskill, Training in new technology.
3. Advanced CAD design and pattern making-New entrant, Upskill, Training in new technology.
4. Quality Control Operator-Upskill.
5. Designer- New entrant, Upskill and Training in new technology.
6. Finishing operator- New entrant, Upskill and Training in new technology.
7. Lasting operator- New entrant, Upskill and Training in new technology.
8. Injection Machine Operator-Upskill.
9. Table operator- Upskill, management and Training in new technology.

10. Cutting operator- New entrant, Upskill and Training in new technology.
11. Mechanical engineer- New entrant, Upskill and Training in new technology.

7. LIGHT ENGINEERING

Light engineering sector in Bangladesh has developed largely as backward linkages to supply industrial machineries and spare-parts to agriculture, printing and packaging, construction, transport, apparel, cement, paper, jute, textile, sugar, food processing, railway, and shipping sectors. While this sector is growing, skill shortage is argued to stymie its potential to upgrade the production processes, technologies and products to the level sophisticated enough to be integrated into the regional value chains. Against this backdrop, this report studies the level of skill of the workers in this sector, different types of skill mismatch, extent of training received by the workers, impact of skill gap and shortage on the enterprises, automation and job displacement, soft skill of the workers and the projection of workers demand by occupations. We also study the impact of Covid-19 on the enterprises and the workers separately.

We begin by conceptualizing different types of skill mismatch, drawing on the current literature on skill. We distinguish between four types of skill mismatch – skill gap, skill shortage, horizontal mismatch and vertical mismatch. To the best of our knowledge, this type of analysis is new to the literature in Bangladesh. Our empirical works on skill mismatch follows from the conceptual framework detailed in the report.

We survey 121 light engineering enterprises and 1522 workers. The novelty of the survey is that it is a worker linked enterprise survey – workers are drawn from the enterprises surveyed in a systematic way. We followed the sampling method of World Bank-Bangladesh Enterprise Survey (WBES) for representativeness. While we closely followed the structure of the questionnaire of Survey of Manufacturing Industries (SMI) of BBS and World Bank-Bangladesh Enterprise Survey, we also take help of a number of internationally reputed surveys for skill such as the World Bank's Skills toward Employment and Productivity Survey (STEP).

Major findings from the enterprise survey

The major findings from the enterprise survey are the following. The first four findings are of the structure of the enterprises while the following five findings are on the skill and skill mismatch. The last four findings dwell on training, automation and job growth.

First, we categorize the occupations in five major categories for better conceptualization – managers, professionals, sales and other service workers, technicians and associate professionals and craftsmen and plant workers, following Bangladesh Standard Classification of Occupations (BSCO). The floor workers (craftsmen and plant workers) dominate the distribution of occupations as out of 3159 workers in our sample enterprises, 2614 of them are craft and plant workers, which is about 83 percent of total employees. While there are 26 workers per enterprise on average, about 22 of them belong to this category. This industry is craftsmen heavy with small number of managers and professionals.

Second, the light engineering is a male dominated sector – only 1 percent of the workers are female. Most of the workers are permanent workers – about 98 percent. The craft and plant works, who constitute about 83 percent of the total workers, receive about 12 thousand taka per

month. The craftsmen received very subsistence level salary which is slightly above the minimum wages in the RMG sector.

Third, this sector is characterized by very high degree of informality of various dimensions. Only 8 percent of the workers are reported to have formal contract for the jobs. Managers and professionals are the ones with the highest share of formal contract. Only 4 percent of the craft and plant workers have formal contracts.

Fourth, horizontal mismatch captures the discrepancy between the desired field of study by the employers and the actual field of study of the current workers. Overwhelmingly, there is no strong preference for field of study by the employers in the light engineering sector, particularly for the craftsmen. About 82 percent of the enterprises do not have any preferences for the subject studied by the craftsmen. About one-fifth of the managers or owners want to hire workers with science background and this figure is only 1 percent for arts background. Note that horizontal mismatch is relevant only for the workers with higher education where they have a well-defined major of study. About 93 percent of the workers do not have any major either in science, arts or commerce. However, only 2 percent of the workers are with science background. The extent of horizontal mismatch is about 28 percent.

Fifth, the average desired level of education by the enterprises is about 11 years with about 10 years (SSC passed) of education for the craftsmen. On the contrary actual level of education is 7.5 years on average. There is a significant discrepancy here between the desired level and actual level. This discrepancy is known as vertical mismatch. On average, we find staggering 80 percent vertical mismatch for the full sample. There is another kind of vertical mismatch with respect to work experiences. The desired and actual level of experiences at the time of entry are 4.27 and 4.84 respectively on average. Hence, there is no vertical mismatch in this case.

Sixth, hard to fill vacancies are regarded as the skill shortage – enterprises have vacancies but cannot fill it them up due to lack of suitable candidates. In the case of craft and plant workers, about 80 percent of the firms opined that they could hire workers in less than a month. The figures by occupations indicate that craftsmen are not very hard to find from the market. Competition from other enterprises has not been regarded as a major threat to hire workers. Managers, professionals and sales related workers are relatively hard to recruit as it takes more than a month in more than half of the cases.

Seventh, in order to understand the gap between the desired level and actual level of proficiency to perform a job by the workers, we asked the managers/owners to scale the level of proficiency of the workers on a 1-10 scale with higher number signifying higher proficiency. The average level of proficiency is 6.94 for all workers. Interestingly, craft workers and machine operators have the lowest score – 6.64, compared to other occupations. Hence the extent of gap is about 3.36 in 1 to 10 scale which can be interpreted as 33.6 percent skill gap.

Eighth, overall impact of skill gap and skill shortage has been reported to be moderate. Skill shortage in sales related workers are largely held responsible for the moderate impact of delay in developing quality products. Skill shortage has not been found to push firms to outsource works much. However, some withdrawal of products due to skill shortage has been reported.

Ninth, the enterprises reported that they would address the problem of skill gap and shortage by increasing the number of trainings and the salary of the workers to attract more skilled labor.

Tenth, the incidence of training received by the workers is extremely low. Only 2.3 percent of the workers received training in the last three years before the interview. Of the trainings, about two-thirds are conducted by external trainees outside factory premises. About 38 percent of the

trainings were 1-2 week long trainings. All 121 enterprises together spent only Taka 9200 in the last three years on the training of the workers.

Eleventh, the industry-TVET linkages has been found to be very low. The share of workers with TVET training is only 1.58 percent of the total workers.

Twelfth, regarding automation and job displacement, we asked to scale the extent of automation a particular occupation may experience in the next 5 to 10 years on a 1-10 scale. On an average the score is 5.58. This indicates that the enterprises did not perceive automation as a threat to consider in the next 5 to 10 years.

Thirteenth, regarding projection of occupations by 2030, the expected growth of the total workers is about 145 percent, with more than 13 percent annual growth. It appears that the longer term outlook is better, as projected by the firms. Sales related workers are expected to grow more than other occupations in the light engineering sector.

Major findings from the worker survey

The major findings from the worker survey are the following.

First, formal education is an important ingredient for skill formation. Hence we discuss the level of education of the workers at length. We find that overall level of education of the workers of the light engineering is very low, including the managers and professionals. This indicates that as the craft and plant operators largely have primary level education, they may not be the right target group for any sophisticated trainings which demand higher level of basic education. The craft workers and plant operators not only have lower level education, their results (GPA) are also worse than other occupation groups.

Second, only less than 5 percent workers are from vocational (TVET) stream and about 10 percent are from madrasa. About 16 percent of the workers passed the SSC examinations; 8.6 percent of the workers have the HSC degree and only 2.5 percent have bachelor degree. Only 42 workers out of 1522 (2.76%) have diploma degree.

Third, as we found in the enterprise survey, only 8.3 percent have ever attended any vocational training in our worker sample. About three-fourth trainings were arranged and financed by the NGOs, private sector and government; the rest is arranged by the employers.

Fourth, there is a huge need for training particularly on sophisticated measurement techniques, auto-molding methods, CNC operation, cutting and fitting, precision welding, quality control, machine maintenance, etc.

Fifth, the floor workers such as craft workers and plant operators largely disagree that formal education helps in performance in their jobs. However, the managers and service and sales workers think formal education is important for their performance.

Sixth, overall reported satisfaction level with the jobs has been found to be higher for the professionals and technicians and associate professionals than other occupations. This is lowest for the service and sales workers and this comes largely from the inadequate salary. Sales workers are also not satisfied with the job prospects.

Seventh, using standard measures for eliciting five aspects of non-cognitive ability-extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, we find that the soft skills are more than the mid-point on a 1-15 scale. The workers also possess soft skills and they think these are also important for team work.

Major findings from the survey on the impact on COVID-19

Major findings from the module on the impact of COVID-19 on the enterprises and the works are the following.

First, In order to capture the impact of COVID-19 in 2000, we collect information for three quarters: January-March, April-June and July-September. Compared to this pre-covid period, total output per enterprise dropped drastically by 60 percent. Overall, the firms were downsized by 12 percent in April-June 2020 compared to the past quarter. Though the full sample shows the full recovery in terms of output, the impact varies with the size of the firms. The smaller firms are worse off due to COVID-19.

Second, we also interviewed the workers to assess the impact of COVID-19. Among all the occupations, the floor workers experienced the largest drop of full employment in April – about 75 percent. The situation improved drastically from June and reached almost pre-Covid level in August. Salary of the workers almost halved in April and then gradually increased. 23 percent of the craft and plant workers went back to villages during lockdown months. A small fraction of the workers did not return to work still in September.

Key recommendations

This report offers three types of recommendations - general recommendations for the improvement of the skills of the workers, sector specific recommendations and the recommendations for designing the second phase of SEIP.

General recommendations for national skill development

i.   Broader definition of skill is required in national plan.
ii.   It has to be recognized that skill acquisition is a life-long learning.
iii.   Clear understanding of how and when skill is formed is required by the policy makers to identify the point of entry of policy intervention. This understanding is essential for the developing countries as it is argued that skill is largely formed through learning by doing at the factories producing low-end goods. Schooling and training play little role in forming skills.

iv.   Alignment of education and skill development policies with industrial policy and long term plans is required for a holistic approach of skill development.
v.   Sector Wide Approach (SWAp) is required for secondary education and TVET together.
vi.   Easily accessible information for all on skill development opportunities is a must for more inclusive skill development strategy.

vii.   Greater social recognition for vocational education is required. Social stigma related to vocational education needs to be removed.

viii.   Regular and high frequency data is required to track sector specific skills and skill mismatch.

Sector specific recommendations

i.   Greater access to finance to acquire new technology and training for the private sector is essential.

ii. Understanding of why most enterprises do not arrange any formal training for the workers is needed.

iii. Industry leaders suggest to create Common Facilities Centers (CFCs) for industry clusters which will include training facilities.

iv. Industry-TVET linkage through an implementable framework is essential.

v. Greater access to institutional training with certification for all technical workers requires to be ensured.

vi. Preparation for embracing 4IR needs to be started right away.

Recommendations for SEIP for designing the second phase

i. Greater focus is needed on mid-level to advanced courses. The market failure is more in the case of higher level trainings.

ii. Right combination of technical vs. management trainings has to be ensured.

iii. Soft skills for the workers should be included in the curricula.

iv. Technical institutes should be the prime vehicle for delivery of trainings through strengthening the current institutes.

v. Right combination of fresh trainees vs. on-job training need to be thought through and ensured.

vi. Partnership with large individual industries should be fostered as they lie on the technological frontier in the country.

vii. Ranking of training institutions can ensure competition among them which in turn will lead to quality improvement of the training. This will also help potential trainees to learn about the quality of the training institutes.

viii. Offering scholarships, on top of tuition waivers, to the trainees can incentivize the potential students.

ix. Demand side interventions such as mass campaigns highlighting the benefits of vocational education and training are required to create demand for such stream.

x. Partnering with international training institutions can ensure quality and accreditation.

8. NURSING

Despite Bangladesh's progress in healthcare sector over the past decades, its fulfillment of constitutional obligations and global commitments is severely constrained by shortages of professional and technical skills in healthcare sector. The lacunae is in adequate supply of qualified, experienced, and specialized nursing professionals. Measured in terms of "skills gap", "imbalance" between demand for and supply of required skills, "inappropriate skill mix", or "inequitable distribution" across rural and urban areas, Bangladesh is experiencing a severe shortage of nursing professionals. Inappropriate skill mix of doctors and nurses - causing doctors to perform tasks nurses are qualified to perform, indicate waste of human resources. Moreover, lack of proper training and experience affects quality of services rendered by the existing nursing professionals. Curriculum and syllabus followed in nursing training are believed to be outmoded; faculty members lack knowledge and modernized information. Shortage of required equipment and facilities for practical class and clinical training are also important constraints.

The purpose of the study has been to analyze projected demand for and supply of nursing professionals in Bangladesh in the next 10-year period, 2020 to 2030: to help the country better plan capacity and quality of nursing training systems. Its major focus is two major areas of

nursing profession in Bangladesh: demand for and supply of nurses in the country, and policy conclusions towards harnessing supply-demand imbalances.

Information base of this study is comprehensive. Hospitals were chosen randomly from a list. A sampling frame comprising of 100 (N) healthcare institutions both in the public and private sectors was formulated considering following criteria:

- Resources, scope and objectives of this study;
- Exclusion of primary level facilities due to unskilled nurses;
- Inclusion of publicly known institutions for broader spectrum of responses;
- Inter and intra-variation of different health care institutions in terms of capacity and services.

Triangulation of information from 50 hospitals, 171 Nurses, 8 FGDs (with approximately 96 experts) and 32 Key Informant Interviews, adding together approximately **349** respondents' contribution, was collated and analyzed, by using quantitative and qualitative methods comprehensively. As nurses and their related specializations were the primary target, it was advised by ADB Focal person that more emphasis be accorded to nurses. It includes both secondary and primary data that comprise of structured quantitative survey of hospitals, employees and expert opinion through qualitative analysis. Various research instruments used by the study include, among others, literature review; Questionnaire Survey, comprising of both Institutions and Employees; Key Informant Interviews; and Focus Group Discussions. Institutional survey was conducted on 50 randomly selected tertiary, secondary and lower secondary level healthcare institutes (i.e. hospitals, clinics) - in both public and private sectors, located across three major cities and one district of the country, namely Dhaka, Chattogram, Rajshahi and Tangail. This methodology was advised by an ADB focal person to ensure that skill specialization needs of nurses working in these specialized hospitals would be best studied in the context of future training needs on specializations, as mentioned by nurses themselves. Lower level hospitals would not have nurses with adequate knowledge and work requirements and articulation of future training needs.

Employee survey covered 171 employees drawn from among employees of 41 of the above-mentioned hospitals and 3 other hospitals from Dhaka. Due to COVID-19 restrictions, the scope of interviewing employees (on duty) was very limited, so purposive sampling technique was utilized to conduct interview of nurses.

To complement quantitative findings, 32 Key Informant Interviews were conducted on professionals from healthcare providing institutions (List is furnished in the Appendices). The qualitative information gathered through these KIIs unveiled various aspects of healthcare, nursing, skills gap, job satisfaction, training needs and related issues. Moreover, eight Focus Group Discussions (FGDs) were conducted particularly with members of the nursing and related professions. The goal was to seek opinion and guidelines on the supply and demand for nursing profession, skills gap, policies and measures already taken or suggested. Towards collating and analyzing data, analytical tools utilized include summary statistics, frequency and percent distribution, cross tabulation, and qualitative analysis like Key Informant Interviews and Focus Group Discussions etc.

Poor skill mix is a serious constrain to the health system. Against WHO recommended ratio of 1:3:5 (doctors: nurses: technologists), the existing ratio in Bangladesh is 1:0.4:0.24 – meaning, for every doctor there are 0.4 nurse, and 0.24 medical technicians. Based on the WHO, Bangladesh has a staggering shortage of more than a lac doctors, almost 5 lac nurses and supportive Midwives including other healthcare providers and technicians.

Demand for nurses in Bangladesh in the year 2030 is estimated to vary between 46,000 and 144,000 – as based on alternate assumptions about population nurse ratio. The lowest figure is due to government figure of one nurse per 4,000 Population – dating back to 2014 though. The

higher figure is due to WHO recommendation of 0.76 nurses per 1,000 people. Both the figures are based on assumptions far apart from the experiences of other countries and regions. Projections based on population - doctor – nurse ratios, on the other hand, give a much higher demand for nurses in the country in the near future. WHO recommends a doctor nurse ratio of 1: 3 – 3 nurses for one doctor, which in the Bangladesh context stands at 0.5 nurses per doctor. Based on a ratio of 1:2 - the minimum projected requirement for nurse in 2030 will be 97,000 nurses. It underlines a population doctor ratio of one doctor for 4,000 people – an extremely low figure to reckon with.

Alternatively, the projected demand for nurses in 2030 will be 483,000 as based on the assumption of 1.28 doctors per 1,000 people – based on the experiences of the Middle Income countries around the world. Even based on South Asian country experiences – 0.75 doctors per 1,000 people, the projected demand for nurses in 2030 will be 283,000.

Finally, based on Bangladesh's experience of 0.47 doctors per 1,000 people as of 2015, the corresponding demand for nurses in 2030 will be 177,000. Now combining together Bangladesh's 2015 experience with South Asian experience, an average of 230,000 would be the projected number of nurses required in Bangladesh by 2030.

More than 95% of the nurses from all types of hospitals felt the need for further training to improve their current work proficiency. Approximately 85% to 95% of nurses felt the need for future job progression. But only 17 % to 27% of them are willing to pay for their training. Four most sought after training needs for nurses of public hospitals are Cardiology, Diabetes, Dialysis, and ICU. Five most important training needed by nurses in private hospitals are: Cardiology, ICU, Community Health, Dialysis, and Burn.

Amongst 50 different nursing occupations comprising sample nurses, most common occupations include senior staff nurse, nursing supervisor, matron, staff nurse and junior staff nurse. Though most occupations are common across public and private hospitals, certain nursing occupations would seem prevalent more in private hospitals than in public - Aide to nurse, junior nurse, junior staff nurse etc. are present in private but not in public hospitals.

Top three levels of nurses facing skills shortage in public hospitals are superintendent, ICU and surgery. The corresponding levels in private hospitals include surgery, staff nurse and ICU. Included are also nurses with specialization in burn, CCU, neuro, OT, cardiology and dialysis, cath lab, oncology, orthopedic, post-operative, etc.

Top three possible consequences of skills shortage in the nursing profession are (a) overwork for existing workforce, (b) poor quality healthcare service provided, and (c) slow progress in the health sector. No less important, skills shortage impedes innovations in medical science and technology.

Two important issues relate to training needs for nurses. First, some of the training needs are quite common across public and private hospitals – training in ICU, dialysis, cardiology, CCU, oncology, etc. Secondly, need for such training is more prominent in private hospitals as reflected by sheer number and as well by diversity of needs. And some of these needs are rather unique to private hospitals.

Limitations of existing institutional facilities for nurses' training, training curriculum is believed to be quite outmoded and logistical planning in training institutes is critical. Lack of practical training in nursing curriculum is most problematic. There must be enough provision for practical training of nurses and could constitute at least 50% of the entire coursework.

Three major types of suggestions were put forward by the key informants: First, enhancing the quality of training provided; on-the-job training of high quality, promotion of practical knowledge,

crises management (nurses are exposed to death regularly), stamina and endurance, adaptability to new situations etc. Second recommendation is proper planning and co-ordination of management. Third, greater emphasis should be accorded to behavioral training of nurses.

The most common need was identified as the need for specialization in critical care nurses. There is a wide array of skill sets that are required in order to be able to carry out the required duties of the HDU, ICU, CCU units and the task simply cannot be carried out by regular nurses; Moreover, need for specialization in cardiology, oncology and dialysis were also common suggestions from the FGDs. In addition, there is need for nurses trained in Wound Management, surgical, peri-operative, burn, diabetes, hematology, transplants and plastic surgery.

Major conclusions of the study include: (i) nursing profession in Bangladesh experiences severe skills shortage with far reaching consequences; (ii) supply side factors constitute major contributor to the perceived skills shortage; (iii) quality of nurse training demands much improvement and up gradation; (iv) lack of specialized nurses is an important aspect of nurses shortages in the country; (v) inadequate infrastructure is a serious stumbling block to increasing supply of quality nurses; (vi) concentration of nursing training facilities in major metropolis may negatively impact interest in nursing education; (vii) inadequate compensation packages are important reasons for fewer nurses in this profession; and (viii) recognition of the role played by nursing profession should be the corner stone of mitigating skills shortage.

9. READY MADE GARMENTS (RMG)

Readymade Garment (RMG) is the largest export-oriented industry in Bangladesh. This industry contributes approximately 81.16% to the country's total export (BGMEA, 2021) employing more than 4 million people, a substantial proportion of the country's total labor force of 69 million (ILO, 2020). The growth of this industry is a key driver of the manufacturing sector growth of the country. RMG industry's expansion has specifically contributed to a rise in women's employment, pushing Bangladesh's female labour force participation rate up to 36.4 per cent in 2017 from around 8% in 1970s.

Low-cost labor is often considered to be the main competitive strength of Bangladesh's RMG industry, while the low productivity of workers raises questions about the real labour cost of production. Despite the growth made by Bangladesh in the RMG industry over the past decades, fulfillment of its global commitment to attain the SGD goals, to be precise, the goals of "decent work and economic growth" and "industry innovation and infrastructure", is severely constrained by the shortage of professional and technical skills in this industry. As we're graduating as a middle-income country soon, this GDP contributing industry needs proper preparedness to face or to adjust with the upcoming changes.

In Bangladesh, RMG industry flourished with the abundance of locally sourced low-cost labor. However, this dependency won't prevail for long as without much education or skill endowment, growth of the industry will be at stake. As Bangladesh is experiencing the golden period of demographic dividend, it would be dreadful if we cannot ensure to thrive the benefit of due to lack of skilled or quality labor force. With increasing demand and industrialization, the labor-intensive industry, RMG, is likely to be watchful about coping with the moving economic environment. Equipping our workforce with the right skills, both technical and managerial as well as with soft skills, can largely prevent this and resolve, to some extent, the crisis of local employment. Indeed, there is an utmost need of skilled workers in RMG industry.

Indeed, the issue of skill enhancement in the RMG industry has received considerable attention in recent years. It is envisaged that developing skills of the existing manpower will increase productivity and improve quality of products which is critical for enhancing competitiveness in the international market. Realizing the importance of this industry in the economy, policymakers have come forward to support the skills development of the people working in major occupational categories of the RMG industry. However, initiating appropriate programmes for skill development involves looking into the existing skill sets, understanding the skill gaps and ways to minimize or address the gap while nourishing and increasing the multifaceted skill components. This study was initiated to understand skill gaps in the RMG industry of Bangladesh.

The main objective of this study is to assess the skills demand and skills supply situation in the RMG industry of Bangladesh and forecast training requirements to minimise the gap. The study will thus attempt to understand the existing occupational and gender composition in the RMG industry and skill gap in the major occupational categories and evaluate the capacity of the industry to ensure skill development across the major occupations. The analysis will also help to unveil areas of skill training programs that can be institutionalized in this industry at large.

This study has followed a mixed method approach i.e., a combination of quantitative and qualitative approach in collecting and analysis data. The survey was conducted on 119 of RMG factories, chosen by applying a stratified multistage sampling method considering their geographical location, nature, and size of factories. According to BGMEA, about 96 percent of the RMG factories are in four districts- Dhaka, Gazipur, Chattogram and Narayanganj and we kept our sample firms limited to those areas. The surveyed factories included 47 woven and 72 knit industries. Knit industries included sweater factories as well. The enterprise survey involved responses from the employer. To get the workers' perspective on skills need, a total of 476 workers were interviewed randomly selected from above mentioned 119 sample enterprises including at least 1 worker from each production unit of the enterprise (Cutting, Sewing, Finishing and Quality). Thus, responses from 476 (4*119) workers were analyzed for this study.

Majority of the surveyed firms (knit and woven) were found to have private single ownership. After initial discussion with several RMG enterprises, we have divided the existing occupations into 10 major categories and then identified some sub-categories. This division allowed us to include all occupations from the woven and knit firms in the RMG industry of Bangladesh. The 10 broader categories include managers, management employees, cutting machine operators, sewing machine operators, finishing machine operators, fusing machine operators, printing machine operators, embroidery machine operators, quality controllers and others. Some of the categories were further divided. As we intended to focus more on the product categories, these sub-divisions allowed us to explore almost all possible jobs involved in the production process in most of the factories.

Many of the knit and woven firms produce multiple products. T-shirt is the highest produced good (31.84%) for the knit firms in our study followed by other knit products (14.61%), polo shirts (11.24%) and ladies' items (10.49%). For the surveyed woven firms Pant is the highest produced good (39.23%), followed by shirts (20.00%), other woven goods (16.15%) and jackets (10.77%).

Employment and Skills in the RMG Industry

There are seven grades in the RMG industry starting from helpers (Grade-7) to management leaders (Grade 1). The female share of employment is higher than their male counterparts in mostly production categories, quality controllers and quality inspectors. The average age for managers and management employees is higher than that of the production and other employees.

The surveyed firms in our study did not report having any temporary or foreign employment in their factories. According to our sample data, the average working hours for managers, management employees and printing machine operators are 8 hours and each of the other employee categories has an average working hour of 9 hours.

For both the knit and woven industry, salaries and other conveniences paid to the employees differ for males and females. This is not because the wage rate for a particular position is different, rather payment differences arise mostly due to differences in the overtime earnings by male and female employees. There is no gender bias in general for recruiting employees (for 76.37% for knit and 77.65% for woven industry, the recruitment is free from gender bias.

There is a definite mismatch in the desired and actual educational qualifications for most of the employment categories in both knit and woven industries. For example, employers prefer master's degree holders for managerial posts but mostly they receive applications from bachelor graduates. Data shows that the interest of the employers mostly centers on public and private institute graduates for administrative and management level positions.

The quality of performance of male and female employees are evaluated using a scale of 1 to 10 considering three attributes- less proficient (score 1-3), moderately proficient (score 4-7) and very proficient (score 8-10). We find that 9.50% of the total employees in the RMG industry are less proficient, 22.86% of the employees are moderately proficient and 67.64% are highly proficient or very proficient in doing their jobs.

Skill Shortage and Skill Gap

Skill shortage refers to not having the required number of employees in the firms or having vacancies (meaning that the firm has the capacity to employ more people but is unable to do so due to shortage in supply of right quality job seekers) and skill gap refers to the lacking on part of the qualifications of the employees in effusively fulfilling their job responsibilities. The survey data reveal that skill shortages is minimum in the RMG factories. Enterprises reported to not having many difficulties in finding people for the vacancies in various occupational categories of knit and woven firms. Interestingly, while woven firms reported that they do not face any difficulties at all to fill up vacancies for printing machine operators and embroidery machine operators, for employers in knit industries, filling up vacancies for these two posts seem to be highest and most daunting. For most posts in both the knit and woven industries, most enterprises reported to fill up the vacancies in less than a week (78% in knit industry and 73% in woven industry).

The study reveals that 53.74% of the surveyed RMG enterprises face skill gaps in general. In terms of categories, skill gaps faced by enterprises are as follows: lockstitch machine operator (74.65% firms), flatlock machine operator (72.31% firms), overlock machine operator (66.99% firms), printing machine operator (66.67% firms), quality inspector (64.91% firms), chain stitch machine operator (63.48% firms), embroidery machine operator (62.50% firms), iron man/woman (60.3% firms), quality controller (57.23% firms) and feed of the arm machine

operator (56.64% firms). In the broad category, most of the surveyed firms' responses indicated highest prevalence of skill gap in the sewing machine operator category along with quality category (both inspector and controller) and printing machine operator and embroidery machine operator categories.

<u>Labor Growth in the RMG Industry</u>

When the employers were asked about the direction of labor demand growth, they based their answers on 5 options including no growth in the labor demand, moderate growth, high growth, very high growth and negative growth. According to the survey data, labor growth in the knit industry would mostly be moderate (76% respondents/firms) in the next 5-10 years, followed by high labor growth projection by 12% firms, negative growth projection by 6% firms, no growth projection by 4% firms and very high growth projection by 2% firms. As this is a perception-based estimate, we can say that most knit firms expect to see moderate growth in the labor demand market. Labor growth projection by the woven garment firms indicate that like in the knit industry most firms expect moderate growth in the labor demand scenario (81%), followed by projection of high growth by 11% firms, no growth by 5% firms and negative growth for 2% firms. To sum up, in the next 5-10 years, employers expect there to be moderate increase in the demand of labor. As a whole industry, the future employment in this industry shows a steady upward trend.

<u>Enterprises' prerogative on Solving Issues related to Skill Shortage, Skill gap and Future Needs of the Industry</u>

Both for combatting skill shortage and skill gap, most enterprises are interested to increase salaries, increase / expand training programs (e.g., even via partnership with local or international consultants/training institutes), redefine the existing jobs in the industry, provide the existing workforce/employees with training opportunities etc. When asked about the training needs for the existing employees there were multiple opinions from the employers. We have gone through all the training needs mentioned by them and clustered the training program into broad categories under each occupation. It is noted that training for overall skill development of all the employment categories is a major concern. Employers ascertain that basic employment training of all the employees at entry-level is a must. Higher level training could be arranged for employees showing potentials to learn those and keep working in the factory. Other than that, need for safety and health-related training including emergency training in case of fire or any other accidents, first aid training and maternal health care training for all the employees have been highlighted.

Funding choices of trainings for the employers vary among different occupation categories of their employees. While none of the surveyed employees commented on funding any trainings for printing machine operators, none of them are willing to fund for embroidery machine operator training either. This may be because the output of these machines depends on the functioning and designing ability of the machines, not the operators themselves. Fusing machine operators are the employees that employers are most enthusiastic about in terms of funding their trainings. Funding for trainings for finishing operators, mangers and quality inspectors hold the second, third and fourth appeal for the employers of this industry. It is also mentionable here that, other than training the fusing machine operators, more than 60% of the employees showed no interest at all in funding for the training of the other employee categories i.e., more than 60% of them do not want to spend any amount for these employee categories.

Employee Skill and Satisfaction: findings from employee survey

Out of the 476 surveyed workers 42% belonged to the medium firms while 34% and 24% of workers were from large and medium firms respectively. Most of the workers are young-adults (82%) aged below 30 years and only 2% of the workers were aged 40 and above. The proportion of male and female workers are almost same. It is noted that, more than half of the workers completed secondary school level education (56%). The proportion of workers from Cutting Machine Operator, Sewing Machine Operator, Finishing Machine Operator, Quality Controller and Quality Inspector were 24%, 26%, 25%, 10% and 15%, respectively.

Around 45% of the small knit factories reported that they faced no skill related difficulties while working in their workplace. However, almost half of the workers (48%) from large industries reported that they faced various difficulties to perform their work due to lack of training while it was 51% and 45% for medium and small industries respectively.

Almost all of the workers (93% and above) believed that training must need for the upcoming technological changes and also for future job progression. 35% and 29% RMG workers of small garments considered formal education to be very important and important respectively, to perform their work proficiently and 20% RMG workers denied the role of formal education at all. However, 71% medium garments worker recognized the role of formal education as important or very important. Similarly, around 69% workers in large garments defined formal education as important or very important to perform work proficiently. About 65%, 54% and 51% RMG workers from small, medium and large garments respectively found off-the-job training to be very helpful to perform their jobs. However, more workers consider on-the-job training to be effective. Around 91%, 84% and 84% garment workers from small, medium and large garments respectively found trainings arranged by the employer to be helpful or very helpful in performing their jobs.

About 35%, 37% and 29% RMG workers from small, medium and large garments respectively thought to face no difficulties to find a similar job after leaving the present job. The remaining workers face difficulties to find a similar job.

Overall, 27%, 21% and 17% of large, small and medium the garment factory workers were dissatisfied with their job prospect/promotion/salary increase respectively.
About the workplace safety/workplace environment, 79% large knit garment workers showed their satisfaction with their workplace safety/workplace environment. Workers from Knit factories believed that the benefits that they received from their factories were better than any other similar firms. Overall, almost 87%, 78% and 81% of the large, medium and small garment workers shared a congenial relationship with their colleagues. Around 51% medium woven garment workers didn't receive any rewards/appreciation for hard working where 34% large knit garment workers reported that they get rewards/appreciation.
Job satisfaction is defined as the level of contentment employees feel with their job. Hence, we tried to find out the level of satisfaction of the workers regarding their current job. Workers who belonged to the small woven factories (19%) were relatively unsatisfied than those of the other factories. This study shows that approximately 36%, 25% and 33% worker from large, medium and small factories were satisfied with their current job. About 41% medium woven garment workers and 37% of small knit garments worker strongly unsatisfied with their current job status.

10. SHIP BUILDING

Bangladesh has the potentiality to revolve herself into a hub of shipbuilding in the global context for small and medium-sized vessels within short time if the current trend of generating revenues continues. Bangladesh has a strong background in building ships since ancient time. Because of the revering geography of Bangladesh, ships have been playing a major role in the trade affairs of the people of this country since the ancient times. Bangladesh is currently contributing to the shipbuilding industries globally. It is little known today that Bangladesh was the center of building ocean-going vessels in Asia between the 15th and 17th century. Bangladesh, a coastal country abundant with rivers, has more than 100 shipbuilders and shipbuilding yards. Out of these shipyards, approximately 70% are located in and around Dhaka. A number of diversified types of vessels are built in various shipyards around Bangladesh, Shipbuilding in Bangladesh has been considered as the most promising industry in the recent time and the country is dreaming to emerge as a middle-income country within a short time by maintaining the upward trend of this sector. In Bangladesh, almost 90% of fuels, 70% of cargos and 35% of passengers are moved by waterways, bringing about a huge domestic demand for vessels. Bangladesh is presently contributing to the shipbuilding industries globally through its exported workforce. These facts do not speak only of a heritage but of an inbuilt ability of shipbuilding of people of this region which had been for ages dependent on waters. Potentials and advantages of Bangladeshi shipbuilding industry lies in growing domestic market, competitiveness for international small vessel segment, and availability of skilled engineers and workers. The number of vessels for overseas market has been growing, and the industry is recognized as one of the potential export-oriented industries (the Seventh Five-year Plan). Accordingly, sector-specific incentive and support schemes are rendered to the vessels that are built for export. So, it is important to analyze skills gap situation in the shipbuilding industries for further improvement in this sector in this backdrop, BIDS has conducted a study of the labor market in the shipbuilding sector for Skill for Employment Investment Project (SEIP) with the following objectives.

The main objective of assignment is to analyze labor supply and demand over the next 10-year period (2020-2030) in order to assist the government and the private industry to better plan the capacity and quality of skills training systems according to the evolving skills/trade/market demands from rapidly growing industry sectors. The second objective of the assignment is to determine sector priorities, assess skills gap by sector, analyze sector-wise occupational composition of employment (including gender composition of employment), assess occupation-wise training requirement by sector and trade.

The specific objectives are to explore the labour market and overall skills gap in the Ship-building sector in Bangladesh. The specific objective of this study are: To take a stock of the overall demand and supply of skills in Ship-building sector and how these demand and supply will change in the next 10 years. To measure various types of skill mismatch including skill gap, skill shortage, over-education and under-education, horizontal mismatch and other indicators of mismatch of the Ship-building sectors. To take stock of the government policy and interventions to produce and upgrade the skills for the Ship-building sector.

We have conducted a linked survey – employee linked enterprise survey. The purpose of the survey is to understand the skill production function of the workers – what are the factors that help form skill? This understanding is essential because this will inform policy makers about the factors to promote to upgrade skills. Both quantitative and qualitative data have been collected. It employed a variety of methodologies such as document review, questionnaire survey using structured questionnaire with concerned enterprises and employees and Key Informant Interview (KIIs) with government officials/president/representatives of associations etc. Besides these, few case studies have been conducted. For the questionnaire survey, a pre-tested structured questionnaire has been used. Guideline/Checklist are developed for KIIs to obtain

information like skill gap/shortage, impacts of COVID-19 for the sector, skills needs and labor demands, future projections for demand of labor, important suggestions for the development of the sector etc. Of the shipyards, nearly 70% are located in and around Dhaka and Narayanganj along the riverbank of Buriganga, Shitalakya, and Meghna, 20% along the Karnapuli river in Chittagong, and 6% along the Poshur river in Khulna, and the remaining 4% in Barisal division. Considering locations/area, a total of 60 enterprises survey (from different locations) and 867 employee survey from different categories and skills have been conducted and ten KIIs have been conducted.

Major Findings from KIIs

Major findings /points as emerged from the KIIs/ discussion are summarized below:

Main reasons for skill gap include lack of proper skills of doing the job due to proper educational background/degree, lack of proper skills of doing the job due to lack of specialized training (some techniques are not available here) and the curriculum of educational institutions is not job oriented. Moreover, some graduates of Marine Engineering/related subjects leave the country every year that creates skill gap in this sector.

Proper training institutes for employee are needed and standardized quality training should be developed. Supports for backward linkages of the industry are needed and connections between TVET and enterprises should be improved. Steps to encourage the technological advancement for sustainable development of the industry are needed.

This industry creates many job opportunities, industrial development, foreign revenues and many other opportunities for this country. So, the government should introduce policies to support and promote this growing industry. The Ministry of Industries has already introduced the Shipbuilding Industry Development Policy 2019 including policies such as a 10-year tax break, cheaper financing, and cash incentives. It would be convenient but infrastructural support is needed at this point. Inadequate electricity supply and outdated technology are limiting the growth of the industry on the supply side.

There has been an increased demand of various kinds of ships worldwide and Bangladesh is an important destination in this market. As Bangladesh has proved itself to be a new and favorable destination for building ships, many foreign buyers are knocking on our doors. Hence, demand for skilled labor will be increased by two times/double and three times/triple (on average) after/within five and ten years from now respectively.

We have to import some raw materials and sometimes the price is too high to effort these. If government help to provide subsidy/other facilities, it will be convenient. Sometimes we face problem to ensure full time production due to skill shortage of labors. We also have logistics challenges because heavy industries like shipbuilding require constant maintenance and port facilities to facilitate the heavy engineering and high-tech work.

Since a lot of investments are needed in the shipbuilding industry, the government must work out a policy for the provision of long-term loans at lowest rates of interest to ensure sustainability in this competitive international market. We need support like easy loans with low interest rates and long-term payment terms for its high social and economic value addition. If we do not receive financial support from the government, it will be impossible for us to compete in the global competitive market.

We have some skilled and cost-effective workforce with expertise in building ships. Also, since our country is a riverine country, we have the advantage of building yards on river banks. Our

satisfactory weather conditions permit us to be more productive compared to shipyards in Europe and other parts of the world. But we have to increase our skilled workforce to avail this advantage in future.

Due to COVID-19 pandemic, some enterprises have shut down the operations of their factory and some have partial operation. Some have faced problems with worker attendance or getting skilled workers. So, it causes negative impact on industry and firm could not produce and loses order from the buyers.

Overall Findings from the Survey

The present study focuses on current situation of shipbuilding sector in terms of skill shortage and skill demand and projects future skill needs, certain issues have come afloat which deserve more attention from researchers. The most important findings revealed by survey of enterprises/employee are the following:

This study distinctly analyzes major 20 occupations (mostly) because of their employment shares exceeding 0.5% in the total employment in the industry. According this criterion, technical worker category of the BSCO code 1-digit occupation level include the highest number of occupations (8).

Around 87% of the employees irrespective of the occupation categories are permanent and 92% of all the employees work as full time. However, if we analyze at BSCO code 1-digit level of occupations, it becomes apparent that manager and professional level employees (white collar hob holders) constitute the lion's share of the permanent employees while around 71% of the primary profession and 82% of the technical employees are permanent. The similar pattern is observed in case of the full-time workers. Almost all of the Manager and professional employees are full-time workers while the figure dropped to 89% and 78% for the technical workers and primary profession employees.

If we consider comparative changes in Employment during 2018 and 2019 (the normal years without being affected by Covid-19 pandemic), the net inclusion in employment of the shipbuilding industry of Bangladesh in the year 2018 and 2019 registered to be 517 and 440 employees, respectively. In both years, this industry employed more technical category and primary profession category employees. The differences in net inclusion in employment during 2018-19 is -77, which implies that 77 employees were less recruited in 2019 than in 2018.

Since Covid-19 pandemic hits Bangladesh in 2020 and the government-imposed lockdown almost during the 2nd quarter, it is interesting to observe how the Covid-19 pandemic situation affected the employment level in the Shipbuilding industry in Bangladesh. The employment in the Shipbuilding Industry during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations. It shows that at the end of the first quarter of 2020 (which can be marked as a normal time because no lockdown was imposed during this period due to Covid-19), a total of 6771 people were employed in the shipbuilding industry of Bangladesh. Since the Bangladesh government-imposed lockdown mostly during the 2nd quarter, the employment drastically fell to 5202 people. Almost every job category employee has been affected and lost jobs during this period but closer inspection reveals that the proportion of job loss is not same varies widely across occupation categories.

White-collar job holders like managers, professionals etc. undergo less physical labour than the blue-collar jobs like technical workers, primary profession workers etc. and completely match with the expectation and reality. Overall, more than half of the shipbuilding industry employees (around 57%) experience high (7 to 10) extent of physical labor.

Technical workers, Primary profession, and Factory and machine operators and machine assemblers are the top three occupation-categories that have the higher number of unfilled vacancies currently (exceeding three-digit figure). Hence, it can be concluded that special attention should be paid on these categories of occupations because there are greater demand for employees in these occupations despite huge skill shortage in the same categories of occupations.

It takes more than a month to fill up the vacant positions across all of the BSCO code occupation categories except technical and primary profession. Not surprisingly, around 47% of the Primary profession and 31% of the technical workers vacant positions are filled-up immediately. Overall, 36% and 24% of the vacant positions in the shipbuilding industry takes more than a month and more than a week but less than a month, respectively. This finding accentuates the skill shortage in the shipbuilding industry.

It is found that "The Job entails shift work/unsociable hours" appear to be the main cause for the Hard-To-Fill vacancies for four occupation categories (Technician and associate professional, Clerical support staff, technical workers and primary professions). Closer inspection reveals that all of these jobs are primarily blue-collar jobs and experience high extent of physical labour. Interestingly, "low number of applicants with the required attitude, motivation or personality" and "Poor terms and conditions (e.g., pay) offered for post" appear to be the main reasons for Hard-To-Fill Vacancies for white-collar jobs like manager and professionals, respectively. Last but not the least, "Lack of qualifications the company demands" has been identified as the prime cause of Hard-To-Fill Vacancies for Factory and machine operators and machine assemblers.

The male-domination in the shipbuilding industry is observed. It shows that males are preferred for around 85% future jobs even while the preference for newly created occupations constitute less than 1% female preference.

Around 31% and 22% of the future occupations will require Bachelor and Masters degree, respectively. Moreover, only 18% future occupation vacancies can be filled-up with SSC equivalent or below educational qualifications. These findings necessitate as well as accentuate the importance of educational attainment for filling up the future occupational job vacancies.

Considering average level of proficiency for each category of profession as well as skill gap, we have concluded that there exists high skill gap in primary profession (3.88) followed by clerical support staff (3.22), Professional (2.75), factory and machine operators and machine assemblers (2.62), manager (2.51) etc. It also shows that helper, finance executive, mechanic, admin, painter working in the shipbuilding industry have high level of skill gap.

The number of training participants over the last two years (2018, 2019) remain almost same. Naturally, the training session participants are male as this sector is a male-dominated sector. It also shows a significant drop in the amount spent for arranging the Training from 24.75 lac taka in 2018 to 19.22 lac taka in 2019. This may indicate the unwillingness from the part of enterprises to spend money behind arranging the training programs. Another interesting fact is revealed by the percentage of training participants who received certificates. It shows that functional training, electrical training, safety training, machine operation and Basic Training participants do not receive any certificates while the more technical training aimed for the white-collar employees provide the participants with certificates.

It is found that around 74% of the trainings in 2018 was conducted by the Internal Trainer in the factory/premise while this figure rose to around 79% in 2019. The share of training program conducted by the External Trainer in the factory/premise has fell down significantly during the

periods. It is also found that around 26% of the enterprises are willing to fund the training programs fully while 21% are completely unwilling to fund them. However, more than half of the enterprises (53%) have expressed their willingness to fund for training arrangement partially.

Overall, the average value of the repetitive tasks across categories shows that employees in the shipbuilding industry perform medium level of repetitive tasks. Around 81% of the enterprises acknowledge that they have plan to train its workers to embrace automated technology in near future. However, enterprises think that only 80% of the technical workers and 25% of the Primary profession employees need to be trained to embrace automated technology while this figure rose to 100% for the rest of the BSCO code 1-digit level occupation categories.

It is found that high growth in the existing jobs of the shipbuilding industry of Bangladesh seems not possible. However, enterprises think that there will be "high growth" in labor demand in the next 10 years in the occupations like technical workers, Primary profession and Factory and machine operators and machine assemblers at the rate of 38%, 35% and 24%, respectively. Hence it is expected that the shipbuilding industry in Bangladesh will not only grow but also demand labor for employment in the industry and this statement is corroborated by the views of enterprises who view that overall, there will be 63% moderate growth and 25% high growth in labor demand in next 10 years.

Overall, the shipbuilding industry will experience around 21% job growth across all occupation categories by 2023. It is expected that the industry will have a 52% employment growth in 2025 from current stage and the same figure rose to around 87% in 2030. It indicates the overwhelming prospect of the shipbuilding industry of Bangladesh.

From employee survey, it is seen that more than one-third (34%) of respondents passed primary level, 35% of respondents passed JSC level, 9.51 % passed SSC, 5.73 % passed HSC and 4.56 % obtained diploma certificate. Moreover, about 4.56 % of the respondents completed bachelor degree and 5.73% of the respondents completed master degree. An overwhelming majority of the respondents for all categories have certificates also have training certified by BTEB. More than three-fifth of the respondents bear expenditure themselves (self) in most occupation categories where these are half in case of clerical support staff and plant and machine operators, and assemblers' categories. Regarding satisfaction, they are almost satisfied with the quality of training (more than 7 in all categories).

Employees think that their experience in this enterprise has increased skill and their skills have market demand in current industry and outside the industry as result is close to 7. They also argued that it will be difficult (6.06) If they want to leave this job to find a similar/ better job. It is also found that employed persons have been declined in April month which is initial stage of lockdown and then it has been increased over time. The salary and HH income also has been decreased during covid-19 lockdown time. Loan has been increased during this period, so it can be concluded that covid -19 has an impact over income of the employee.

Conclusion and Recommendations
The survey of shipbuilding firms also indicates that there are a number of skills gaps in workers from different occupations in shipbuilding sector and these findings necessitate as well as accentuate the importance of educational attainment for filling up the future occupational job vacancies. This finding also accentuates the skill shortage in the shipbuilding industry. Based on the study findings we recommend that the government could take the following measures to address the skills constraints in the shipbuilding sector.

- Set up specialized institutes/training centre to train up entrepreneurs/workers on for producing international standard ship products.
- Improving linkages between TVET and enterprises and also with different institutions (training, research and academic) and establish high-level coordination platforms in this regards.
- Supports for backward linkages of the industry and incorporate skills training relevant to market needs through involving the private sector in institutional management.
- Incorporating steps to encourage the technological advancement for sustainable development of the industry as automation is important factor.
- Integrate shipbuilding expansion plan as strategic development programme of the country and the sector needs a favorable regulatory framework to support the industry.
- Improve its employee benefit scheme such as: performance bonus, festival bonus and medical allowance as these allowances can motivate employees.
- Create a strong and active pool of trainers through arranging proper ToT (training of trainers) programs. This could be performed by providing support to appropriate institutions to arrange local and foreign ToT trainings on a regular basis. Foreign experts could be invited as trainer in these training programs.
- There is huge investment opportunity in this sector (ship-building, ship maintenance and repair services, supply of parts, components and fittings etc). So, investment in the sector should be increased and public-private partnership can be arranged in this regard.
- For the betterment of quality assurance, obtain knowledge in line with survey system of the international classification society (DNV-GL (Det Norske Veritas and Germanischer Lloyed) and Bureau Veritas (BV) assessing the trainees here). This assessment is globally accepted and enhance the trainee's salaries both in domestic and overseas employment. So, emphasis should be given to obtain international certification to increase domestic and overseas employment