

Labor Market and Skills Gap Analysis for the Shipbuilding Sector in Bangladesh

Dr. S M Zahedul Islam Chowdhury

Research Fellow, BIDS

Maruf Ahmed

Research Associate, BIDS

Skills for Employment Investment Program (SEIP)

Finance Division, Ministry of Finance

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Abbreviation

AEOSIB	Association of Export Oriented Shipbuilding Industries of Bangladesh
BSCO	Bangladesh Standard Classification of Occupations
BTEB	Bangladesh Technical Education Board
DWT	Dead Weight Tonnage
EU	European Union
HRM	Human Resource Manager
GT	Gross Tonnage
KIIs	Key Informant Interviews
MPV	Multi-Purpose Vessel
SBA	Senior Business Analyst
SEIP	Skill for Employment Investment Project
TVET	Technical and Vocational Education and Training
WTO	World Trade Organization

Executive Summary

Background

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 riverine 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.

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.

Specific Objectives

The specific objectives of the study are to explore the labour market and overall skills gap in the Shipbuilding sector in Bangladesh. The specific objectives of this study are:

- To take 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.

Methodology

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. Guidelines/Checklists are developed for KIIs to obtain information like skill gap/shortage, impacts of COVID-19 for the sector, skills needs and labor demand, future projections of demand for 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/ discussions 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 for 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 at 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 afford these. If the government helps 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 logistic 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 the lowest rate 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 a 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 riverbanks. 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 ourselves of this advantage in future.
- Due to COVID-19 pandemic, some enterprises have shut down the operations of their factory and some have partial operations. Some have faced problems with worker attendance or getting skilled workers. So, it caused negative impact on industry, and the firm could not produce the ordered goods and lost orders 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 the survey of enterprises/employees are the following:

- This study distinctly analyzes 20 major occupations mostly because of their employment shares exceeding 0.5% in the total employment in the industry. According to this criterion, technical worker category of BSCO code 1-digit occupations 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 full time. However, if we analyze BSCO code 1-digit level of occupations, it becomes apparent that the managerial and professional level employees (white collar job 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 managerial and professional employees are full-

time staff 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 hit Bangladesh in 2020 and the government imposed lockdown from 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 show 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 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 the same, it varies widely across occupation categories.
- White-collar job holders like managers, professionals etc. undergo less physical labour than those of the blue-collar jobs like technical workers, primary profession workers etc. . 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 to 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 the BSCO code occupation categories except technical and primary professions. 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 take more than a month and more than a week but less than a month respectively. This situation 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 these jobs are primarily blue-collar jobs and require 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 the 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 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 master’s degree respectively. Moreover, only 18% of future occupation vacancies can be filled-up with SSC equivalent or below educational qualifications. These findings clearly shows 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), professionals (2.75), factory and machine operators and machine assemblers (2.62), manager (2.51) etc. It also shows that helpers, finance executives, 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) remains almost the same. Naturally, the training participants are mostly male as this sector is a male-dominated sector. It also shows a significant drop in the amount spent on arranging the training from 24.75 lac taka in 2018 to 19.22 lac taka in 2019. This may indicate the unwillingness on 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 the participants of functional training, electrical training, safety training, machine operation and basic training participants do not receive any certificates while the more technical training arranged for the white-collar employees provide the participants with certificates.
- It is found that around 74% of the training 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 fallen 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 the training program 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 plans to train their 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. 63% of the respondents gave their opinion in favour of moderate growth and 25% for 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 by 2025 from the current stage and the same figure rose to around 87% in 2030. It indicates the overwhelming prospect of the shipbuilding industry of Bangladesh.
- From the employee survey, it is seen that more than one-thirds (34%) of the respondents passed primary level, 35% of the respondents passed JSC level, 9.51 % passed SSC, 5.73 % passed HSC and 4.56 % obtained diploma certificates. Moreover, about 4.56 % of the respondents completed bachelor's degree and 5.73% of the respondents completed master's degree. An overwhelming majority of the respondents of all categories have certificates and also have training certified by BTEB. More than three-fifths of the respondents bear expenditure by 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 skills, and their skills have market demand in current industry and outside the industry (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 the number of employed persons declined in April 2020 which was initial stage of lockdown and then it has been increased over time. The salary and HH income also decreased during covid-19 lockdown time. Loan taking 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 the workers in different occupations in shipbuilding sector and these findings show accentuation of the importance of educational attainment for filling up the future occupational job vacancies. This finding also reveals the skill shortage in the shipbuilding industry. Based on the study findings we recommend that the government take the following measures to address the skills constraints in the shipbuilding sector.

- Setting up specialized institutes/training centers to train entrepreneurs/workers 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 regard.
- Supporting backward linkages of the industry and incorporating skills training relevant to market needs through involving the private sector in institutional management.
- Incorporating steps to encourage technological advancement for sustainable development of the industry as automation is an important factor.

- Integrating shipbuilding expansion plan with strategic development programme of the country and the sector needs a favorable regulatory framework to support the industry.
- Improving its employee benefit scheme such as performance bonus, festival bonus and medical allowance as these allowances can motivate employees.
- Creating 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 trainers for these training programs.
- There is a huge investment opportunity in this sector (shipbuilding, 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, obtaining knowledge in line with survey system of the international classification society (DNV-GL (Det Norske Veritas and Germanischer Lloyd) and Bureau Veritas (BV) assessing the trainees here) is important. This assessment is globally accepted which enhances the trainee's salaries both in domestic and overseas employment. So, emphasis should be given to obtaining international certification to increase domestic and overseas employment.

Chapter 1: Introduction

1.1 Background

The world shipbuilding industry currently benefits from the market of 60 million gross tonnage (GT) of annual building in 2017. The value of global orders is estimated to grow to about USD 650 billion in 2026. Three Asian shipbuilding giants, China, Japan and SouthKorea, have almost 90% of global market share, followed by EU. Other countries are competing for the remaining 5% of new building orders. While three Asians and EU seek for orders of larger vessels (more than 50,000 dead weight tonnage: dwt) in general, an opportunity exists for other countries to enter the smaller vessel segment.

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 riverine 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. Many countries of Asia and Europe regularly bought ships built in Chittagong. It is quite natural in that Bangladesh has more than 200 rivers with a total length of about 22,155km plus a long coastline on the Bay of Bengal. 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. These yards are mainly engaged in building and repairing inland and coastal vessels, up to 3,500 DWT (Dead Weight Tonnage). As per the World Trade Organization (WTO), global shipbuilding market size is US\$ 1,600 billion. If only 1% market share can be captured by Bangladesh, it will be worth US\$ 16 billion. If we can grab 1% of the global order for only small ships market the amount will be worth US\$ 4 billion. Bangladesh is suitable for small and medium combine cargo vessel, multipurpose vessel and oil tanker up to 15000 DWT and some extend to 25000 DWT, however it predicts that small cargo and containership market will also be feasible for Bangladesh in coming years. In a long-term perspective shipbuilding is both a promising and a challenging industry. Until very recently the average increasing rate of ships in tonnage was approximately 21 million GT (Gross Tonnage) per year. Considering US\$ 7,620 as construction cost per GT, total market size is US\$ 1,600 billion.

1.2 Present Status

A number of diversified types of vessels are built in various shipyards around Bangladesh, such as: multipurpose vessel, fast patrol boat, container vessel, cargo vessel, tanker, dredging barge, ferry, passenger vessel, landing craft, tourist ship, tug boat, supply barge, deck loading barge, pleasure craft/hatch, crane boat, speed boat, deep sea trawler, self-propelled barge, inspection vessel, cargo coaster, troops carrying vessel, double decker passenger vessel, hydrographic survey boat, pilot boat, hospital ship, water taxi, etc. By 2012 Bangladeshi component manufacturers could manufacture 50% of the total material, machineries and equipment of the inland/ coastal vessels built. This proportion for an international classed vessel to be built in Bangladesh is at present 10% and there is a strong need to build the backward linking industry if the Bangladeshi shipbuilding sector is to gain a higher world share of all new buildings.

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. However, due to global nature and the long-term sustainability of this shipbuilding industry, an investigation of competitiveness in terms of global standard is of prime importance. There are more than fifty shipyards in Bangladesh and a hundred of shipbuilders or contractors and marine workshops are actively involved in shipbuilding activities. 70% of the shipyards are located in and around Dhaka, 20% are in Chittagong and 10% are in Khulna and Barisal. Almost all inland/coastal/bay crossing ships are constructed and repaired locally in these shipyards. Most of the Shipyards are operating under individual management with nominal supervision of government. All inland and coastal ships are built by local shipyards, and the number of vessels built per year counts an average of 250. Recently few local shipyards have attained the capability to manufacture the ships of 10000 DWT. Nearly fifty thousand skilled workers and one lac semi-skilled workers, are now working in these industries. There are eleven local shipyards of international standard capable of making ships up to 10000 DWT.

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. Domestic demand has been growing constantly over the past decade. Locally registered number of vessels has increased with average annual growth rate of 5.39% on average, owing to steady economic and trade developments, and activated infrastructure projects. Annual market value of local shipbuilding currently reaches about USD 1 billion, and the demand growth is forecasted to remain steadily. Bangladeshi shipbuilding industry has been exploring export market opportunity in the niche segment of small vessels (below 12,000 dwt). The industry has started accumulating a track record of building orders from international ship owners. Export value has increased, from USD 5.7 million in 2012-13 to USD 30.0 million in 2017-18. Although some shipyards have export capability, those equipped with modern building facilities (such as computer-based control machining) and building experiences along with international "class" standards remain a few (as represented by Western Marine, Ananda shipyards). Annual building capacity for export orders is estimated as more or less 20 vessels currently. The majority of local shipyard production is directed to domestic market. Vessels for inland water usage are largely built in local shipyards. On the other hand, domestic demands for ocean-going vessels have been met by overseas shipyards as well.

1.3 Rationale

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. Shipbuilding, an ancient assembling industry producing tailored products, accordingly having the largest human input per unit of produce, is always moving to countries with lower wages of required skills. Bangladesh has comparatively a lower cost of human inputs and can offer the best combination of cost, quality and productivity with its fast growing young workforce. Unfortunately, the shipyards in Bangladesh are facing exorbitantly high financing charges as compared to foreign yards. Unlike other manufacturing industries the product takes two years to be delivered and requires high cost finances over a long period. This weakens the competitiveness of Bangladeshi yards. However, in general, government policy in Bangladesh is to encourage and attract foreign investments. More than 100,000 skilled workers and 150,000 semi-skilled workers are employed in the shipbuilding industry. At present more than 10,000 inland/coastal ships are plying all over the country, carrying more than 90% of total oil transportation, 70% of total cargo transportation and 35% of all passenger transportation. With global shipbuilding orders of very large vessels increasing every day, a market is emerging in Bangladesh for shipbuilding yards that can concentrate on producing smaller sea-

going vessels as the industry leaders like China, South Korea and Vietnam go for the larger container ships, bulkers and tankers. But there are a number of skills gaps in workers from different occupations in shipbuilding sector. This sector has high potential for growth, competitiveness, and export capabilities. Future demand for skilled and educated workforce of the sector will be needed. As the availability of cheap labor provides an advantage, proper training will be needed for further improvement. Bangladesh has a high proportion of working age population. This demographic dividend can be fruitful if qualitative skill profile of the labor force is enhanced through skills training interventions. Bangladesh has to develop skills in line with industry's need. But this points to the need for remaining alive to any possible market failures in skills training as well as the need to correct for them by the government. As the country's cargo and oil products are transported by small ships, cargo vessels and tugs through its coastal and inland waterways and people use ferries and steamers to travel from one part of Bangladesh to another, most of these vessels are built in the country, and the shipbuilding industry is aiming to win orders from abroad, it is expected to create many thousands of jobs.

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 World Bank Group estimates that Bangladeshi shipbuilding grows at 10-15% per annum on average for the next decade. The National Industry Policy 2016 sets the following three goals; i) to improve socio-economic condition of Bangladesh through concerted efforts of public-private initiative for rapid industrialization and employment generation; ii) to raise contribution of the industry to GDP from 29% to 35% by 2021; and iii) to ensure accomplishing inclusive growth by increasing quality employment generation through industrialization. In the National Industry Policy, shipbuilding industry is designated as one of the priority sectors for industrial promotion. A few Bangladeshi ship builders have experienced to produce vessels for export. 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 against 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.

1.4 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. done

Specific Objectives

The specific objectives are to explore the labour market and overall skills gap in the Ship-building sector in Bangladesh. The specific objectives of this study are:

- To take 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 Shipbuilding sectors.
- To take stock of the government policy and interventions to produce and upgrade the skills for the Shipbuilding sector.

1.5 Scopes

The study team has tried to cover the following aspects:

- To project the requirement of skilled workforce, we have tried to find a consolidated picture of the number of semi-skilled and skilled manpower in shipbuilding sector in the present time and prepare a projection for the next 10 years.
- To determine the types and levels of training programmes which are needed to meet the skills demands in the shipbuilding sector.
- To determine the expected skills that the employers in these fields require.
- To provide a possible picture of labour demand and supply in shipbuilding sector by skills level and suggest how to upgrade skills supply to meet future skills needs, including through new skills training programmes.

1.6 Some Conceptual Note about Skill and Skill Mismatch

This brief concept note has helped sharpen our understanding of various issues, forms and measurements of skill mismatch. These conceptual issues have guided us to determine the scope of our study and also to design the questionnaire so that we can elicit the right information we want from the surveys.

Market failure: Transferable vs. non-transferable skills

Employers have little incentive to invest in skill development of the employees if skills are transferable across firms or industries. Becker (1962) argued that firms will not pay for the training for general skills where return to firm is lower than the returns to employees. In this case, market fails and this justifies the intervention of the government. This provides a guideline for identifying the areas the government should consider imparting training on.

If the skill is very firm-specific or transferable across only a small number of firms, wages may not rise as much as the productivity of the trained worker, and hence the firm can appropriate some of the returns from these skills. In such cases, the firm has a greater incentive to invest in an employee acquiring the skill.

Soft vs. Hard skills

Soft skills include non-cognitive abilities or personality traits such as teamwork, communication, work ethic, time management, work under pressure, etc. While there is increasing evidence on the high return of soft skills, we do not consider capturing soft skills in this study. Our study focuses on hard skills only which include specific skills to perform a specific job. done

Skill Mismatch

Skill mismatch refers to various types of imbalances between skills offered and skills needed in the labor market. The broad concept of skill mismatch can assume different forms, such as vertical mismatch (over-education and under-education), horizontal mismatch (field of study), skill gaps, skill shortages and skill obsolescence. Skill mismatches, in all of its forms, is a major source of labor underutilization. For example, if workers in a firm are overeducated than what is actually required for the particular job they are working, this means that the firm is wasting a part of labor productivity which, if skill had matched perfectly, could have been used to generate a higher level of output. Similarly, under-education means that the firm is not operating at its full potential, losing a part of output which could have been gained in the absence of the mismatch. All labor market actors, e.g. the government, corporations and workers need to ensure that the appropriate skill gets employed at the appropriate job in order to shape labor market outcomes which leads to higher growth, productivity and competitiveness (ILO 2014). In developing countries, the first order problem is skill shortage and skill gap – there are not enough skilled workers available and if available they do not possess the required level of skill. In the following sections we will briefly discuss various forms of skill mismatches and how to measure them.

1.6.1 Forms of Skill Mismatches

Skill Gap

Skill Gap is a firm-level measure of skill mismatch based on employer's perception about the ability of employees. It measures the degree to which workers lack adequate competencies to successfully perform their current duties at job. This type of skill mismatch may cause lower output per worker, increase labor cost, incur additional costs on recruitment and training and adversely affect firm-level profitability. done

Skill Shortage

Skill Shortage refers to a situation where employers cannot find suitable candidates with certain skills to fill job vacancies. Situations like this are characterized by market conditions where the demand for skills by employers cannot be met by the available supply at the equilibrium wage rates. An important feature of this firm-level measure is that it is directly linked with skill gap; whenever firms find it hard to fill vacancies due to lack of a particular skill-group, they are forced to recruit inadequately skilled workers for those positions

Over-education and Under-education

Measured at the level of individual's circumstances, over-education and under-education refer to the degree to which workers' education levels are above, below or poorly matched with those required for their current jobs. In the case of job vacancies, the measure relates to the degree to which applicants' education level meet the hiring requirements. This is also known as vertical mismatch.

Horizontal Mismatch

Horizontal Mismatch refers to situations where workers get employed in jobs that are neither related to their education, nor to their skills and knowledge. The measure identifies any mismatch between the workers' primary field of study and the skills actually required for their current jobs.

1.6.2 Measurement Issues of Skill Mismatch

Skill Gaps

Skill Gaps are typically measured from information perceived by the employer on skill insufficiencies among the workers in a firm. However, similar perception-based information is also collected from the employees themselves on their skills and expertise. For example, we can ask for responses on a scale from 1 (not at all) to 5 (to a very high extent) to the question: “To what extent does this work require more knowledge and skills than you can actually offer” with 4 and 5 denoting skill gap. It is found in the literature that employees tend to over-report skill gap compared to employers, maybe because, while responding to questions on skill gap, the former are more likely to consider future career requirements, rather than immediate job requirements (McGuinness and Ortiz 2016).

Skill Shortage

Surveys aiming to measure skill shortage generally involve asking two separate sets of questions to the employers, with one trying to establish the existence of unfilled or hard-to-fill vacancies and the other trying to gather information on the reasons underlying any recruitment difficulties. There are, however, some sources of bias in the estimate coming out of employers’ responses. Employers tend to inflate the true magnitude of recruitment difficulties by adding to it their inability to offer necessary salary, working conditions to attract workers with relevant skills (Cedefop 2015).

Over-education and Under-education

There are three approaches in literature to measure over-education and under-education, namely subjective method, realized matches method and job evaluation method. The first two are the most commonly used methods in literature. Each method has its own advantages and disadvantages and estimates from the three approaches might differ and produce conflicting results.

The subjective method collects a worker’s self-assessed responses to questions “what the levels of qualifications are required ‘to get’ or ‘to do’ your current job” and “what is the highest level of qualification you have”. These responses are then compared to determine if the worker is overeducated (level of education higher than that is required), undereducated (level of education lower than that is required) or matched (level of education equal to the requirement). Variables denoting over-education and under-education might take both the forms of binary dummy and the years of over-education and under-education. The subjective method is relatively easier to apply in survey data. However, this method cannot be retrospectively applied to existing data and the method is prone to subjective bias.

The realized matching method or the empirical method estimates the mean or mode value of educational requirement for a particular job and compares it with each worker’s education level. The greatest advantage of this method is that it is applicable to existing micro datasets, such as national labor force survey, containing information on educational qualifications and occupation, hence facilitates cross-country comparisons. One of the disadvantages of the realized method is that instead of actual skill requirements, it takes an average measure of qualifications of all workers. Therefore, the method less closely captures the required education level “to do a job” compared to that of “to get a job”. Another drawback of the method is that due to limited sample size, it can only capture skill mismatch for broad occupational groups (e.g. health professionals), not at a disaggregated level for individual job title (e.g. nurse).

The job evaluation method uses the field expertise of professional job analysts to measure the educational requirements for different occupations. This approach is less prone to subjective bias as it uses specialized knowledge on the particular field and hence more accurate compared to the other methods.

Horizontal Mismatch

Measuring horizontal mismatch involves asking workers to assess the relevance of their current job with their field of study and expertise. Some studies measured the mismatch independently by comparing a field of study variable with occupation codes (Robst 2007 and 2008 and Allen and de Weert 2007).

1.6.3 Other Indicators of Mismatch

1. Relative wages

Any imbalance in the labor market is likely to be reflected in relative wages where wages and prices can move freely. As the market slowly adjusts to the shortage for particular skills, this trend will be observed as wage differential over time.

1. Flow of new entrants and quitters
2. Cost of hiring process and hiring standard
3. Training expenditure by firms

1.7 Methodology

Sample Size Determination

There are two main/central associations for shipbuilding industries (although there are some local associations also) in Bangladesh. One is Bangladesh Ship Builders' Association and other is Association of Export Oriented Shipbuilding Industries of Bangladesh (AEOSIB).

In determining the sample size of the firm survey, the study will use the methodology widely used by the World Bank. The following formula will be used in determining the sample size:

$$n = \left[\frac{1}{N} + \frac{N-1}{N} \cdot \frac{1}{PQ} \left(\frac{k}{Z_{1-\alpha/2}} \right)^2 \right]$$

Where, N=population size, P=population proportion, Q=1-P, k=desired level of precision, $Z_{1-\alpha/2}$ is the value of the normal standard coordinate for a desired level of confidence, $1-\alpha$.

According to Bangladesh Ship Builders' Association, about 103 shipbuilding establishments have been reported registered as members (as on 2019). On the other hand, AEOSIB includes only export oriented shipbuilding firms and its members are found to be 15. So, if we calculate minimum sample sizes for this population (118) with 7.5% precision in 90% confidence intervals, the minimum sample size tends to be a sample size of 60. done

Linked Survey

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.

We have picked two employees from each occupation/task with the consultation of the manager in such a way that one is skilled one and the other is unskilled on in manager's view since the manager/employer knows best about the level of skill of his or her workers. done

1.8 Data Collection Method

1.8.1 Quantitative and Qualitative Methods

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/areas, a total of 60 enterprise survey (from different locations) and 867 employee survey from different categories and skills have been conducted and ten KIIs have been conducted.- done

1.8.2 Instruments

The following sets of instruments have been developed and utilized for collecting data. The instruments include quantitative questionnaires and in-depth interviews with key respondents.

The questionnaire for survey data has been prepared keeping in mind the following basic areas, but not limited to:

- 1) Current and future demand of the shipbuilding sector.
- 2) Existing capabilities of the workforce before participating in the training provided by current institutions.
- 3) Available institutions which provide skills training in the fields.
- 4) Specific types of skills training are provided by existing institutions.
- 5) Types and levels of training programmes that will be needed in future to meet the skills demands in each sector. done

1.8.3 Methods of Analysis

Descriptive statistical analysis has been performed to understand the sector and its labor demand and skill gap situation. The results of the quantitative data have been triangulated with qualitative data generated through KIIs.

Chapter 2: Skills Gap Analysis: Findings from the Enterprise Survey

2.1 Outline of the Shipbuilding Industry

Position of the Industry: Bangladeshi shipbuilding is the upcoming player in global market, and competitive enough for the smaller vessel segment benefiting from relatively cost competitive engineers and workers. Experiences of export building- exists for the vessel types of MPV and passenger ferry, but still remains limited. Accordingly, the industry largely works for the orders from the domestic market.

Shipyard and Production: Industry association reports around 100 shipbuilders and over 120 registered shipyards of varying size, located mostly on the riverbanks. With the current limitations of sites and low river draft across the country, it is possible to build vessels of size up to 15,000-20,000 dwt, being relatively smaller by the competing nations. Annual gross production reaches 250,000 GT at present, of which 185,000 GT are said for domestic orders. Vessel types built locally for domestic usage include MPV, container, bulker, tanker, dredger, tug as well as passenger ferry, and ranges from 1,000 to 20,000 dwt in size. Smaller vessels for domestic usage, inland waters in particular, are usually built without application of “class” standards. The domestic market has two segments. One is for inland water vessels, and the other is for ocean-going vessels. These segments have almost the same size, and the number of registered vessels for each segment currently amounts to 13,000. Bangladesh shipbuilding industry has to largely rely on domestic demand over the short and midterm, and leverage the building experiences of the higher quality domestic vessels to deepen capability of building export-quality vessels, and thus to realize more international orders.

Materials/ Components: Shipbuilding is a material and component intensive industry. Shipbuilding industry in Bangladesh depends on import for mostly materials and components. Over 80% of materials and components are imported for either export or ocean-going vessels, while vessels for inland waters have broadened local supply basis more up to 50 to 60%. According to the industry, materials such as steel pipe, heavy metal-cast parts like propeller and anchor, components of engine, generator, transformer, and a certain type of fixture including sanitary equipment, furniture, upholstery, etc., generally rely on import. On the other hand, steel plate, angle steel, cable, paint become procurable from local suppliers. Bangladesh is well known for ship breaking and recycling industries, which are generally located close to shipbuilding yards where arc furnace is usually installed to handle scrap materials. This enables local shipbuilders to procure steel materials with ease for body building of inland water vessels in particular.

Growing Domestic Market: Shipbuilders can expect growing domestic demand for various types of vessels for usage in inland and coastal water, and ocean-going vessels for regional cargo shipping, owing to steady economic/ population growth, trade expansion, and ongoing/ scheduled infrastructure projects (that would increase demand for inland water shipment). Vessel types of fuel tankers, bulkers, cargo feeders, dredgers, tugs as well as passenger ferries would be increasingly demanded. The World Bank estimates that almost 300 to 400 vessels be additionally demanded over the next decade. As the Bangladeshi shipbuilding industry is not able to deliver classed vessels in sufficient quantity, some of demands shall be met by Chinese industry.

Competitiveness for International Small Vessel Segment: Bangladesh has potential to compete for small vessel segment up to 12,000 dwt (MPVs, cargo feeders and passenger ferries for regional services) in

international market, since labor cost matters more as vessel size is smaller. Bangladeshi shipbuilding can enjoy labor cost competitiveness of 20 to 30% relative to other countries, according to a local trade body. A few local shipyards have already track record of building export quality vessels along with the class standards, however, capability to build classed vessels needs to be diffused widely together with expansion of the suitable shipyard facilities.

Availability of Skilled Engineers and Workers: Bangladesh has competitively-priced skilled engineers and semi-skilled workers. Tailor-made training opportunity for shipbuilding is also available under the cooperation between the government and industry association, which generates 6,000 workers every year and matches over 70% of them with job opportunities in the industry.

Availability of Shipbuilding Cluster: Bangladeshi shipyards are agglomerated along the banks of major rivers in Narayanganj and Chittagong in particular, mostly combined with ship breaking and recycling yards. These areas have relatively convenient access to the utilities (power and gas) and supporting industries such as suppliers of steel materials, components and fixtures.

Investment Opportunity

Bangladesh is an alternative and prospective place for building small size vessels clustered below 25,000 dwt, or 12,000 dwt realistically (given the current limitation of shipyards and low river draft across the country), which can foresee the growing demand either from domestic or international markets. FDI or joint-venture is most expected to enhance both capacity and capability of local industry to build class ships with international standards through:

- Development of new shipyards, or expansion/renovation of the existing ones,
- Upgrading of shipyards with modern facilities such as computer-based machining, bending, welding, shot blasting as well as heavy lifting required for steelworks and component assembling for relatively larger vessels,
- Receiving technical assistance for more sophisticated shipbuilding along with international class standards and improved productivity. done

Ship Maintenance and Repair Services: Another area of investment opportunity lies in maintenance and repair services, which are more labor-intensive than building new ships. Since many vessels ply Bangladeshi waters, there would be general chances to benefit from this shipping traffic. This would require further development of dry docks (or renovation of the existing breaking/ recycling docks) to accommodate such vessels as required for overhaul with sufficiently deep river draft.

Supply of Parts, Components and Fittings: There are other potential areas of investment such as backward linkage development. FDI or joint-venture by overseas suppliers could contribute largely to reducing dependence on imported materials and components, and enhance locally added value for vessels both for domestic and export markets. Suppliers of steel pipes, engines, generators, compressors, transformers, metal works (flanges, valves, propellers, anchors, etc.) could be promoted locally.

Vocational Training Business on Shipbuilding: Vocational training business on shipbuilding and marine engineering is expected to be enriched further, possibly through FDI or joint-venture (with the existing educational or training institutes), since the industry reports a scarcity of skillful engineers and welders especially for the higher quality and more sophisticated vessels.

2.2 Enterprise Survey

This study covers 60 factories from 04 divisions: Dhaka, Barishal, Chittagong, Khulna. 30 factories are located in rural areas, while the rest 30 are situated in the urban areas. Around 48.33%(N=29) factories reported that they have head offices located elsewhere (detached from the factory compound). The percentage of enterprises which are a part of an agglomerate stands out as 20%(N=12). Seven enterprises reported to have multiple factories. The number of factories producing similar and different types of products is 13 in both cases.

Overview of the Industry from the Survey

Table 1 shows that this study covers 60 enterprises which employ 6708 people in total. It shows that overall output per enterprise in 2019 stands out 6871 (in lac taka) while the export per enterprise is 2755.47 (in lac taka). Hence, the export to output ratio per enterprise is 40%. It means that around 40% of the revenues in the shipbuilding industry of Bangladesh comes from the export earnings.

Table 1 Brief Overview of the Shipbuilding Industry in Bangladesh

Indicators	Full sample
Employment	6708
No. observations	60
Output per enterprise (2019) in lac taka	6871.297
Export per enterprise (in lac taka)	2755.467
Capital stock per enterprise (in lac taka)	2130.095
Export/Output per enterprise	40.10

2.3 Employment in the Shipbuilding Industry

From the survey, table 2 shows the list of the occupations along with their shares in Shipbuilding Industry. It shows that there are employees belonging to the **60 occupations**. These occupations are distributed under the BSCO-1 digit level occupation category. There are one to four digit level occupational classification in Bangladesh Standard Classification of Occupations (BSCO) which implies major Group ,sub-Major Group ,minor Group and Unit Group etc. For convenience of discussion, only one(1) and (4) digit level occupations are considered here. Moreover, this study distinctly analyzes **major 20 occupations (mostly)** because of their employment shares **exceeding 0.5%** in the total employment in the industry. Occupations with employment shares **less than 0.5%** has been grouped as **“Other”**. According to this criterion, technical worker category of the BSCO code 1-digit occupations level include the highest number of occupations (8). The annex part in some sections report the detailed accounts of the 20 occupations which have employment shares exceeding 0.5% level.

Table 2 List of the Occupation (BSCO code 1 and 4 digit) along with their shares (%)

7.Technical workers (15)	1.Manager (11)	8.Factory and machine operators and machine assemblers (9)	3.Technician and associate professional (8)	2.Professional (6)	9.Elementary Profession (6)	4.Clerical support staff (4)	5.Service and sales staff (1)
Welder (21.05)	Management/ Manager (2.10)	Machine Man (3.55)	Foreman (0.76)	Engineer (1.36)	Helper (19.13)	Production Manager (0.19)	Security (0.39)
Fitter (15.15)	Finance Executive (0.83)	Crane Driver (1.33)	Assistant Engineer (0.49)	Accountant (0.98)	Office Assistant (0.31)	Computer Operator (0.10)	
Painter (9.68)	Deputy Manager/ (0.34)	Mechanic (1.10)	Supervisor (0.31)	Admin (0.91)	Turner (0.25)	Receptionist (0.04)	
Cutter man (4.40)	Assistant General Manager (0.22)	Machine Operator (0.83)	Technician (0.19)	Naval Architect (0.64)	Peon (0.18)	Store keeper (0.03)	
Electrician (4.05)	HRM (0.21)	Logistic (0.25)	Junior Engineer (0.15)	Stress Analyst (0.07)	Office Clark (0.13)		
Grinder (3.73)	General Manager/ (0.19)	Docker (0.21)	Agent (0.12)	Chief Engineer (0.04)	Labor (0.04)		
Carpenter (1.68)	Director (0.16)	Fabricator (0.07)	Sareng (0.12)				
Gas Cutter (0.82)	Senior Executive (0.13)	Wing Man (0.01)	Marine Engineer (0.03)				
Plumber (0.42)	Managing Director (0.10)	Technical Assistant (0.01)					
Mason (0.15)	Chairman (0.01)						
Lath Machine Operator (0.07)	SBA (0.01)						
Send Blaster (0.06)							
Molding Technician (0.03)							
Core Maker (0.03)							
Black smith							

7. Technical workers (15)	1. Manager (11)	8. Factory and machine operators and machine assemblers (9)	3. Technician and associate professional (8)	2. Professional (6)	9. Elementary Profession (6)	4. Clerical support staff (4)	5. Service and sales staff (1)
(0.01)							
(61.33)	(4.34)	(7.33)	(2.18)	(4.04)	(20.05)	(0.37)	(0.39)
15	11	9	8	6	6	4	1

Table 3 reports the total number of employments by gender in the Shipbuilding Industry. This survey finds that a total of 6708 people is employed in 60 enterprises. Majority of the employees are stationed in the factory level (6445 employees) and this industry can be marked safely as a male-dominated industry (only 143 employees are female out of 6708 employees). One remarkable finding is that there are no foreign employees working in this industry. Tables with respect to BSCO 1-digit and BSCO 3-digit level occupations are shown in [Annex](#).

Table 3 Total Number of Employment by Gender

Occupations 1-digit	At Factory			At Head office			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Manager	144	2	146	140	5	145	284	7	291
Professional	194	11	205	60	4	64	254	15	269
Technician and associate professional	119	1	120	24	2	26	143	3	146
Clerical support staff	14		14	11		11	25		25
Service and sales staff	26		26	0		0	26		26
Technical workers	4003	101	4104	6	4	10	4009	105	4114
Factory and machine operators and machine assemblers	488	4	492	0	0	0	488	4	492
Elementary profession	1329	9	1338	7	0	7	1336	9	1345
Total	6317	128	6445	248	15	263	6565	143	6708

Table 4 shows the composition of permanent, temporary, full time and part time employees in the shipbuilding industry. It reports that around 87% of the employees irrespective of the occupation categories are permanent and 92% of all the employees work as full timers. However, if we analyze at BSCO code 1-digit level of occupations, it becomes apparent that manager and professional level employees (white collar job 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. A similar pattern is observed in case of the full-time workers. Almost all 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.

Table 4 Composition of Permanent, Temporary, Full Time and Part Time Employees

Occupations 1-digit	Total Employment	Percentage of permanent workers	Percentage of temporary workers	Percentage of workers with full time	Percentage of workers with part time
Manager	291	98.28	1.72	99.66	0.34
Professional	269	96.28	3.72	98.14	1.86
Technician and associate professional	146	95.21	4.79	98.63	1.37
Clerical support staff	25	100	0	100	0
Service and sales staff	26	92.31	7.69	100	0
Technical workers	4114	82.33	17.67	89.47	10.53
Factory and machine operators and machine assemblers	492	94.51	5.49	97.56	2.44
Primary profession	1345	70.93	29.07	77.62	22.38
Total	6708	87.38	12.62	92.35	7.65

Table 5 illustrates the comparative changes in employment during 2018 and 2019 (the normal years without being affected by Covid-19 pandemic). Net inclusion in employment in a particular year is defined as the total hiring in that year less of the total firing in year . If this figure is positive, it means that more employees are hired than fired. In other words, the industry employs people and has demand for employees. One of causes/reasons for firing and hiring is that the temporary workers were changed over time. Employers also mentioned (discussed over telephone) that hiring is occurred more in 2020 due to lockdown situation (during covid-19 period). 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 difference in net inclusion in employment during 2018-19 is -77, which implies that 77 employees were less recruited in 2019 than in 2018. done

Table 5 Comparative Changes in Employment during 2018 and 2019

Occupations 1-digit	Hired in 2018	Hired in 2019	Fired in 2018	Fired in 2019	Net inclusion in employment in 2018	Net inclusion in employment in 2019	Differences in Net inclusion in employment in 2018-19
Manager	20	26	8	10	12	16	4
Professional	30	36	11	8	19	28	9
Technician and associate professional	22	20	13	9	9	11	2
Clerical support staff	2	3	1	2	1	1	0
Service and sales staff	2	1	4	1	-2	0	2
Technical workers	1385	1467	1029	1139	356	328	-28

Occupations 1-digit	Hired in 2018	Hired in 2019	Fired in 2018	Fired in 2019	Net inclusion in employment in 2018	Net inclusion in employment in 2019	Differences in Net inclusion in employment in 2018-19
Factory and machine operators and machine assemblers	116	117	79	105	37	12	-25
Primary profession	306	320	221	276	85	44	-41
Total	1883	1990	1366	1550	517	440	-77

2.4 Employment in the Shipbuilding Industry during Covid-19 (01 January to 30 September, 2020)

Since Covid-19 pandemic hit 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. Table 6 shows the employment in the Shipbuilding Industry during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations. The table 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. In almost every job category employees have been affected and have lost jobs during this period but closer inspection reveals that the proportion of job loss is not the same and varies widely across occupation categories (see figure 1 and figure 2 also).

Table 6 Employment during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations

Occupations BSCO 1	1st Quarter			2nd Quarter			3rd Quarter		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Manager	310	2	312	2	1	264	312	2	314
Professional	266	9	275	194	7	201	247	9	256
Technician and associate professional	165		165	145		145	170		170
Clerical support staff	27		27	26		26	27		27
Service and sales staff	26		26	14		14	25		25
Technical workers	4197	93	4290	3206	27	3233	3962	84	4046
Factory and machine operators and machine Assemblers	488	4	492	446	4	450	460	4	464
Primary profession	1175	9	1184	867	2	869	1086	9	1095
Total	6654	117	6771	4900	41	5202	6289	108	6397

Figure 1 Employment during the first three quarters of Covid-19 Pandemic across BSCO code 1-digit level of occupation categories

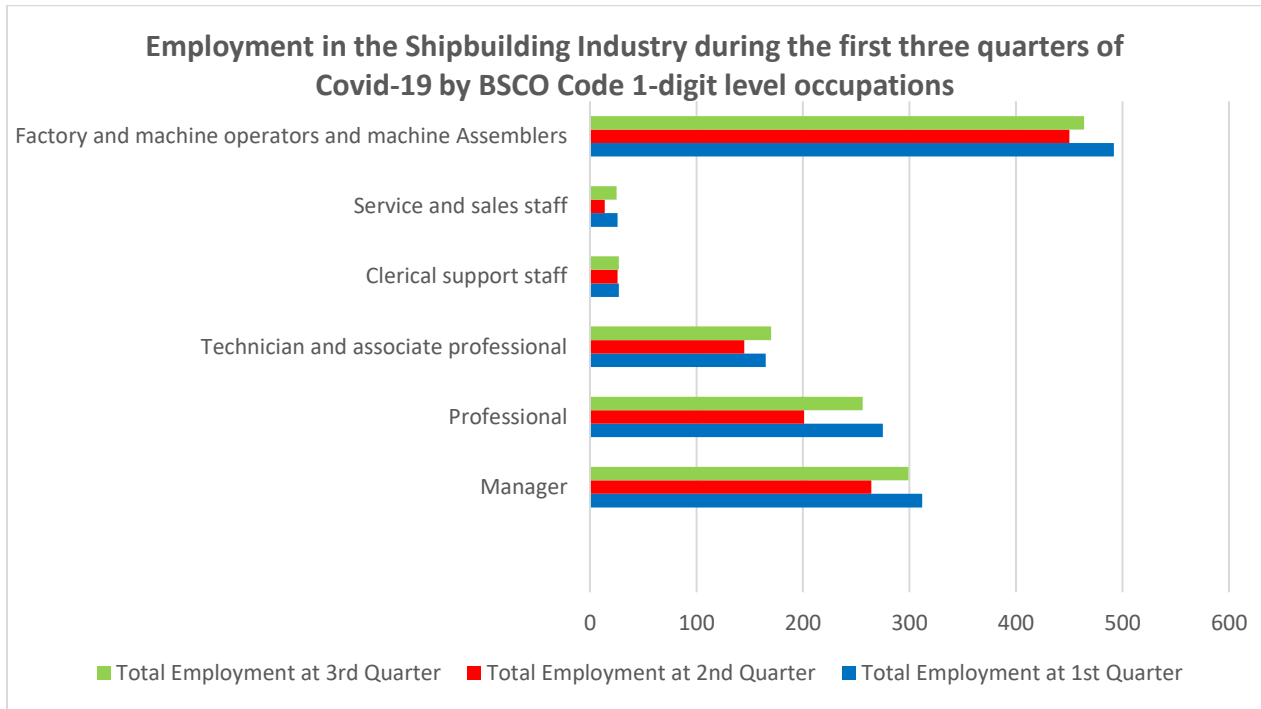


Figure 2 Employment during the first three quarters of Covid-19 Pandemic across BSCO code 1-digit level of occupation categories (continued)

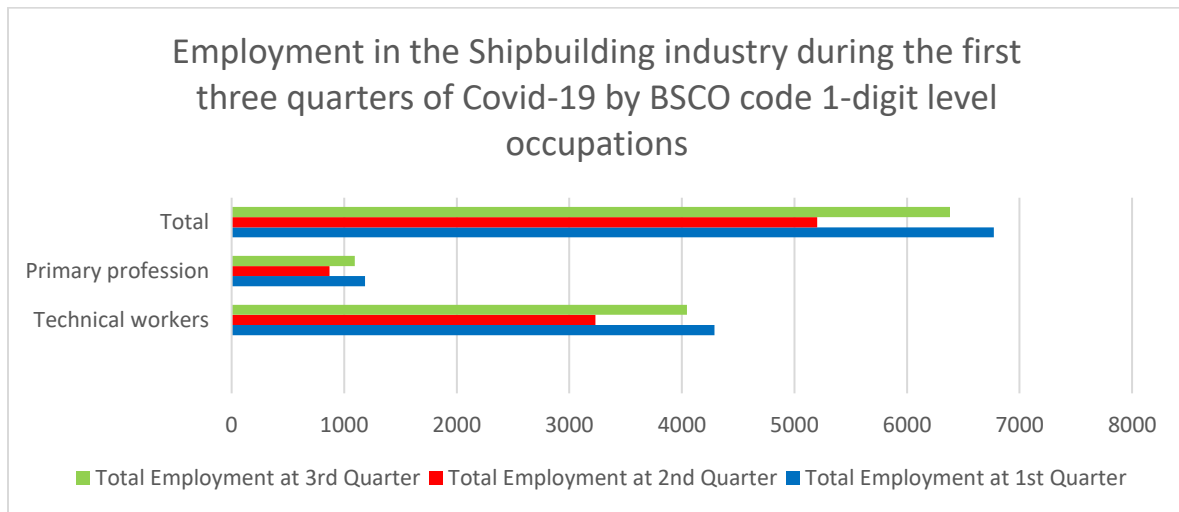


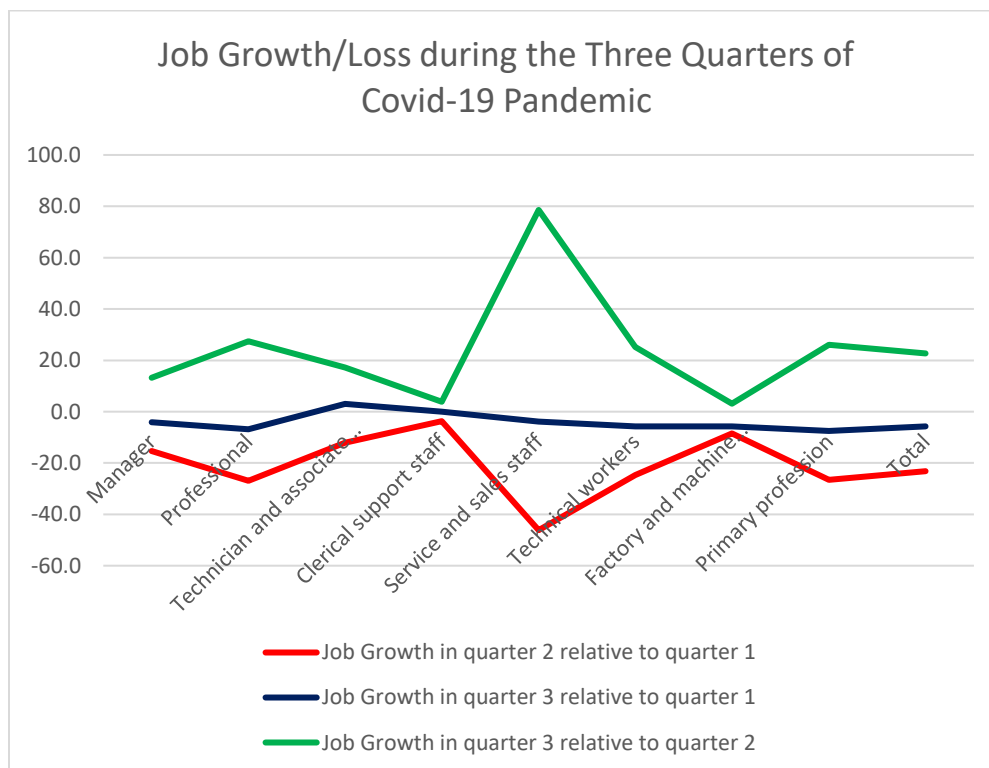
Table 7 illustrates the Job Growths (+) and loss (-) in the Shipbuilding Industry during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations. This table is of particular interest because it shows how employment in various occupation categories are affected due to the Covid-19. It shows that employees of every occupation experienced negative job growth (job loss) in quarter 2 relative to quarter 1 but the rate of job loss fell disproportionately on occupation categories. For example, job loss registers the highest for Service and sales staff in quarter 2 relative to quarter 1. During the same period, overall,

23% of all employment shrank in the shipbuilding industry. However, the industry gets back to its motion and has managed to bring down its job losses from 23% (in quarter 2 relative to quarter 1) to around 6% in quarter 3 relative to quarter 1 (see figure 3).

Table 7 Job Growth (+)/ loss (-) during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations (%)

BSCO 1-digit code	Occupations	Job Growth (+)/ loss (-) in quarter 2 relative to quarter 1	Job Growth (+)/ loss (-) in quarter 3 relative to quarter 1	Job Growth (+)/ loss (-) in quarter 3 relative to quarter 2
1	Manager	-15.4	-4.2	13.3
2	Professional	-26.9	-6.9	27.4
3	Technician and associate professional	-12.1	3.0	17.2
4	Clerical support staff	-3.7	0.0	3.8
5	Service and sales staff	-46.2	-3.8	78.6
7	Technical workers	-24.6	-5.7	25.1
8	Factory and machine operators and machine Assemblers	-8.5	-5.7	3.1
9	Primary profession	-26.6	-7.5	26.0
	Total	-23.2	-5.7	22.7

Figure 3 Job Growth (+)/ loss (-) during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations (%)



2.5 Average Monthly Salary by Occupations Level

Table 8 presents the average monthly salary across occupations levels. There exist huge wage gaps across occupation categories between males and females. It is not only a male-dominant industry rather it can be marked also an industry where significant wage differentials exist. Females at managerial level earn on an average 35417 taka while a male belonging to the same post earns on average 49287 taka. However, the female employed in the Factory and machine operators and machine assembler occupation category exceeds that of males in average monthly salary (due to very low female participation). A male engaged in the primary profession of the shipbuilding industry earns 10146 taka on average as monthly salary while the figures drastically fell to 4630 taka for a female in the same post. From employers' point of view, female salary is lower than that of male for this particular job and sometimes, it (job) is not convenient for female workers.

Table 8 Average Monthly Salary by Occupations Level

Occupations BSCO 1	Average Monthly Wage (in Taka)			Average Monthly Convenience (in Taka)			Average Monthly Total Salary Expenses (in Taka)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Manager	41502	31845	41270	7785	3571	7683	49287	35417	48953
Professional	24767	13056	24114	3097	5000	3203	27864	18056	27317
Technician and associate professional	29697	12222	29338	3164	1111	3122	32861	13333	32460
Clerical support staff	16100		16100	2600		2600	18700		18700
Service and sales staff	12340		12340	769		769	13109		13109
Technical workers	16861	5286	16565	1087	794	1080	17948	6079	17645
Factory and machine operators and machine assembler	16614	26667	16695	910	833	910	17524	27500	17605
Primary profession	9892	4630	9857	254	0	252	10146	4630	10109

2.6 Extent of Formality – Contract Type, Leaves and Other Benefits

Table 9 shows the extent of formality- contract type with respect to BSCO 1-digit level occupation. Among all the employees, around 45% of them are permanent and under written contract while 27% are permanent and under oral contract. Thus, the overall number of permanent employees in the shipbuilding industry stands at 72%. However, of the 28% temporary employees, around 23% are employed under oral contract. Moreover, temporary as well as oral contract are mostly concentrated in the occupations like Primary profession (47%), Technical workers (35%), Factory and machine operators and machine assemblers (17%).

Table 9 Extent of Formality- contract type with respect to BSCO 1-digit level occupation

Occupations BSCO 1	Permanent		Temporary	
	Written Contract (%)	Oral Contract (%)	Written Contract (%)	Oral Contract (%)
Manager	67.86	28.57	3.06	0.51
Professional	79.62	16.60	3.77	0.00
Technician and associate professional	55.68	40.91	2.27	1.14

Occupations BSCO 1	Permanent		Temporary	
	Written Contract (%)	Oral Contract (%)	Written Contract (%)	Oral Contract (%)
Clerical support staff	72.22	27.78	0.00	0.00
Service and sales staff	0.00	100.00	0.00	0.00
Technical workers	29.06	29.68	6.40	34.87
Factory and machine operators and machine assemblers	59.12	14.47	9.69	16.73
Primary profession	32.09	17.22	3.84	46.85
Total	44.90	27.39	5.20	22.51

Like table 9, table 10 also attempts to explain the extent of formality with respect to the percentage of unpaid vacation rather than employment contract nature across BSCO 1-digit level occupation. Table 2.12 shows that around half or more than half of the technical workers and primary profession employees have to spend weekly vacations unpaid let alone sickness and casual leaves. Around 80% of the technical workers and 70% of the primary profession employees have to undergo leaves without any pay. Around 91% of the employees experience maternity/ paternity leave on unpaid condition.

Table 10 Extent of Formality-Percentage of Unpaid Vacation with respect to BSCO 1-digit level occupation (%)

Occupations BSCO 1	Weekly (%)	Sickness (%)	Causal (%)	Maternity/Paternity (%)
Manager	1.03	5.21	21.51	87.5
Professional	7.55	15.69	18	76.09
Technician and associate professional	11.36	20.93	46.34	97.3
Clerical support staff	11.11	25	37.5	75
Service and sales staff	0	14.29	28.57	100
Technical workers	50	78.54	78.72	94.37
Factory and machine operators and machine assemblers	18.87	36.73	62.5	85.11
Primary profession	52.83	69.57	85.11	100
Total	30.81	48.41	58.22	90.98

Table 11 also explains the extent of formality with respect to the overtime and termination notification across BSCO 1-digit level occupations. More than 84% of the technical workers, Factory and machine operators and machine assemblers and Primary profession employees have to undergo overtime work. Overall, 89% of the employees notify the employers in advance in case of leaving the jobs while 95% of the enterprises notify the employees in advance in case of firing the employees.

Table 11 Extent of Formality – Overtime and Termination Notification with respect to BSCO 1-digit level occupation (%)

Occupations BSCO 1	Whether employees work overtime (%)	Percentage of the total workers doing the overtime (%)	Percentage of the total workers get paid for the overtime (%)	In case of leaving the jobs, employees notify the employers in advance (%)	In case of firing the employees, enterprise notify the employees in advance (%)
Manager	18	74.47	73.24	98.47	98.84
Professional	31.58	62.22	68.24	97.46	99.76
Technician and associate professional	68.18	93.27	90.59	92.13	99.49
Clerical support staff	33.33	76.67	76.67	98.29	100.00
Service and sales staff	42.86	91.67	75.00	84.00	100.00
Technical workers	88.15	80.53	81.54	84.60	92.04
Factory and machine operators and machine assemblers	83.64	74.43	76.13	89.00	94.44
Primary profession	85	87.02	85.69	84.84	93.70
Total	68.17	80.57	81.10	88.95	94.82

2.7 Occupation by Qualification Matrix

This section focuses on the desired versus currently held workforce’s educational attainment of the shipbuilding industry. The comparative analysis between table 12 and 13 show that around 86% of the managers are desired to have at least Bachelor (the figure sums both bachelors and masters’ percentages) degree, but in reality 74% of the currently held workforce at managerial level have at least Bachelor (the figure sums both bachelors and masters’ percentages) degree. This basically shows the gap in educational qualifications of the employees across desired level and obtained level. A similar pattern follows the same situation for the other occupation categories.

Table 12 Desired Occupation by Qualification Matrix-Level of Education (%)

Occupations BSCO-1	Illiterate	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocation	Bachelor	Masters
Manager	0	0	0	2.97	9.9	0	0.99	46.53	39.6
Professional	0	0	0	5.17	1.72	31.03	1.72	36.21	24.14
Technician and associate professional	4.44	0	20	17.78	15.56	11.11	0	24.44	6.67
Clerical support staff	0	0	0	0	22.22	11.11	0	55.56	11.11
Service and sales staff	14.29	14.29	57.14	14.29	0	0	0	0	0
Technical workers	8.39	6.99	53.5	18.88	0.7	0	1.05	10.49	0
Factory and machine operators and machine assemblers	1.82	14.55	29.09	30.91	1.82	5.45	3.64	12.73	0
Primary profession	18.33	20	41.67	8.33	1.67	1.67	0	8.33	0
Total	6.28	6.6	33.33	14.65	3.86	4.51	1.13	20.29	9.34

Table shows that around 86% of the Service and sales staff, 77% of the technical workers, 58% of the Factory and machine operators and machine assemblers, 83% of the Primary profession employees do not study even up to SSC level. The same figure for overall employees stands at 52.49%.

Table 13 Occupation by Qualification Matrix -Average qualification level currently held by workforce -Level of Education (%)

Occupations BSCO-1	Illiterate	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocation	Bachelor	Masters
Manager	0	2.97	0.99	3.96	13.86	0.99	2.97	28.71	45.54
Professional	0	0	3.45	5.17	6.9	29.31	3.45	25.86	25.86
Technician and associate professional	0	6.67	20	24.44	6.67	6.67	0	26.67	8.89
Clerical support staff	0	0	0	0	33.33	0	0	55.56	11.11
Service and sales staff	0	28.57	57.14	14.29	0	0	0	0	0
Technical workers	1.05	18.18	57.69	12.59	0.35	0	1.05	9.09	0
Factory and machine operators and machine assemblers	0	14.55	43.64	23.64	0	1.82	3.64	12.73	0
Primary profession	1.67	36.67	45	3.33	5	0	0	5	3.33
Total	0.64	14.49	37.36	11.27	4.51	3.54	1.61	15.62	10.95

Table 14 describes the differences in educational attainment of the workforce in the shipbuilding industry with respect to the educational background like science, arts and commerce. For example, around 8% of the managers are desired to have Arts background while around 31% of the Arts background are at present working in the managerial posts in the shipbuilding industry. This phenomenon applies mostly to all categories of occupations. However, around 63% of the enterprises reported to have no idea about the desired background of the workforce employed across various occupation levels.

Table 14 Desired versus Currently held Occupation by Qualification Matrix-Field of Education (%)

Occupations BSCO-1	Desired Qualifications				Average qualification level currently held by workforce		
	Science	Arts	Commerce	Do not Know	Science	Arts	Commerce
Manager	23.76	7.92	31.68	36.63	35.64	30.69	33.66
Professional	60.34	0	32.76	6.9	37.93	29.31	32.76
Technician and associate professional	37.78	13.33	0	48.89	44.44	33.33	22.22
Clerical support staff	22.22	33.33	33.33	11.11	22.22	33.33	44.44
Service and sales staff	0	0	0	100	14.29	42.86	42.86
Technical workers	9.79	8.39	0.35	81.47	27.97	66.78	5.24
Factory and machine operators and machine assemblers	32.73	5.45	0	61.82	56.36	34.55	9.09
Primary profession	3.33	6.67	5	85	38.33	51.67	10
Total	20.29	7.73	9.34	62.64	34.62	49.92	15.46

Table 15 reports the difference in the desired and currently held workforces' experiences at the entry level. Some of the occupations like managers, Technician and associate professional, Service and sales staff, technical workers, Factory and machine operators and machine assemblers, Primary profession employees have more experiences than the desired level at the entry stage. It may possibly result from the skill shortages of the workforce in the shipbuilding industry. Hence, the next section will analyze the skill gaps of the workforce employed in the shipbuilding industry in Bangladesh from various angles.

Table 15 Difference in Experiences at the Entry Level

Occupations BSCO-1	Experience at the entry level (in Years)	
	Desired	Currently held
Manager	4.05	4.47
Professional	3.43	3.28
Technician and associate professional	3.16	3.73
Clerical support staff	3.00	2.67
Service and sales staff	1.00	1.43
Technical workers	3.15	3.29
Factory and machine operators and machine assemblers	3.41	3.55
Primary profession	1.78	1.85

2.8 Skill Shortage

This section describes the existent skill shortage in the Shipbuilding industry of Bangladesh. Skill shortage is described in terms of gender preferences across occupations, extent of physical labour, extent of difficulties in filling out the vacancies and time taken to fill up the vacant positions.

Table 16 illustrates the gender preferences across occupations (BSCO code 1-digit level) in the Shipbuilding Industry. As this study mentioned shipbuilding industry to be a male-dominated industry, the veracity of this statement is proved once again in Table 2.18. Across the occupation categories, 82% prefer male for employment while around 16% accounted for no gender preference. Only 1.42% preferred females for employment in the shipbuilding industry.

Table 16 Gender Preferences across Occupations (%)

Occupations (BSCO-1)	Male	Female	No Preference
Manager	73.68	0	26.32
Professional	75.47	0	24.53
Technician and associate professional	85	0	15
Clerical support staff	44.44	11.11	44.44
Service and sales staff	100	0	0
Technical workers	84.67	2.68	12.64
Factory and machine operators and machine assemblers	84.09	0	15.91
Primary profession	94.55	0	5.45
Total	82.42	1.42	16.16

Table 17 shows the extent of physical labour across BSCO code 1-digit level occupations in the shipbuilding industry. It reports that technical workers (86%), factory and machine operators and machine assemblers (77%) and primary profession (80%) employees on average experience high (the mean also exceeding a value of 7) extent of physical labour (7 to 10). On the contrary, the manager, professional level employees perform jobs on an average with medium level of physical labour. These findings conform to the phenomenon that 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 labour.

Table 17 Extent of Physical Labour across BSCO Code 1-digit level Occupations (%)

Occupations BSCO-1	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager	43.16	53.68	3.16	3.58
Professional	32.08	64.15	3.77	4.09
Technician and associate professional	7.5	65	27.5	5.68
Clerical support staff	44.44	44.44	11.11	4.11
Service and sales staff	16.67	83.33	0	4.67
Technical workers	0.38	13.79	85.82	7.55
Factory and machine operators and machine assemblers	0	22.73	77.27	7.27
Primary profession	3.64	16.36	80	7.56
Total	12.26	31.08	56.66	6.31

Table 18 illustrates the extent of difficulties in filling up the vacancies across BSCO code 1-digit level occupations in the shipbuilding industry. It shows that Factory and Machine Operators and Machine Assemblers (52%), Professionals (47%), Technician and Associate Professional (45%) are the top three occupation-categories that experience high (7 to 10) extent of difficulties in filling up the vacancies. The overall mean value (5.29) of the extent of difficulties in filling-up vacancies suggests that there exists skill shortage in the Shipbuilding industry of Bangladesh. Unfilled vacancies constitute around 22% of total current employment in the shipbuilding industry. 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 to these categories of occupations because there are greater demand for employees in these occupations despite huge skill shortage in the same categories of occupations.

Table 18 Extent of Difficulties in filling up the vacancies across BSCO Code 1-digit level Occupations

Occupations BSCO-1	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	No. of Unfilled vacancies currently	Total Employment level at present	Unfilled vacancies as % of total current employment
Manager	29.47	33.68	36.84	4.88	63	291	21.65
Professional	18.87	33.96	47.17	5.51	63	269	23.42
Technician and associate professional	25	30	45	5.43	38	146	26.03
Clerical support staff	11.11	44.44	44.44	5.56	7	25	28.00
Service and sales staff	100	0	0	1.83	4	26	15.38
Technical workers	20.31	39.85	39.85	5.46	968	4114	23.53
Factory and machine operators and machine assemblers	9.09	38.64	52.27	6.11	116	492	23.58
Primary profession	38.18	32.73	29.09	4.62	239	1345	17.77
Total	23.62	36.41	39.96	5.29	1498	6708	22.33

Table 19 reports the time taken to fill up the vacant positions across BSCO Code 1-digit level occupations in the Shipbuilding Industry. 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 take more than a month and more than a week but less than a month respectively. This finding reflects accentuation of the skill shortage in the shipbuilding industry.

Table 19 Time taken to fill up the vacant positions across BSCO Code 1-digit level Occupations (%)

Occupations BSCO-1	Immediately	Less than a week	More than a week but less than a month	More than a month
Manager	4.21	10.53	24.21	61.05
Professional	5.66	7.55	33.96	52.83
Technician and associate professional	20	20	15	45
Clerical support staff	11.11	22.22	11.11	55.56
Service and sales staff	16.67	16.67	0	66.67
Technical workers	31.42	18.39	25.67	24.52
Factory and machine operators and machine assemblers	25	13.64	34.09	27.27
Primary profession	47.27	14.55	12.73	25.45
Total	24.16	15.45	24.33	36.06

2.9 Main Causes for Hard-To-Fill Vacancies

This study mentions that there exists higher level of skill shortage in the shipbuilding industry and this statement is corroborated by the extent of high difficulty level and lengthy time taken for filling-up the vacant positions in the shipbuilding industry of Bangladesh. Now, in this section, this study aims at revealing the main causes for hard-to-fill vacancies.

Table 20 illustrates the main causes for hard-to-fill vacancies across BSCO code 1-digit level occupations in the shipbuilding industry. “The Job entails shift work/unsociable hours” appears to be the main cause of 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.

Table 20 Main Causes for Hard-To-Fill Vacancies across BSCO Code 1-digit level Occupations (%)

Occupation BSCO-1	Poor terms and conditions (e.g. pay) offered for post	Low number of applicants with the required skills	Low number of applicants with the required attitude, motivation or personality	Low number of applicants generally	Lack of work experience the company demands	Lack of qualifications the company demands	Poor career progression/lack of prospects	Job entails shift work/unsociable hours	Too much competition from other employers	Not enough people interested in doing this type of job	Seasonal Work
Manager	71.43	51.43	80	28.57	57.14	42.86	28.57	68.57	17.14	25.71	2.86
Professional	79.17	50	70.83	25	50	50	37.5	75	16.67	20.83	4.17
Technician and associate professional	72.22	44.44	72.22	22.22	72.22	50	27.78	88.24	11.11	16.67	11.11
Clerical support staff	50	25	50	0	50	25	0	100	0	25	0
Technical workers	88.46	50	60.58	24.04	64.42	68.27	56.73	89.42	25	23.08	7.69
Factory and machine operators and machine assemblers	56.52	56.52	34.78	34.78	60.87	65.22	43.48	60.87	43.48	30.43	8.7
Primary profession	87.5	37.5	62.5	6.25	68.75	62.5	50	100	18.75	25	0
Total	79.46	49.11	62.95	24.11	62.05	59.38	45.09	82.51	22.77	23.66	6.25

Note: The Color indicates: =1st cause; =2nd cause; =3rd cause

2.10 Occupations that are not Currently Filled Up in Enterprises but will be Filled Up Now or in the Near Future to Expand Businesses or Cutting Costs

This section deals with occupations that **ARE NOT CURRENTLY** filled up in the shipbuilding enterprises but would like to hire them now or in the near future to expand your business/increase productivity/cutting cost. The enlisted enterprises in this study proposed for a total of 130 occupations (including the overlap).

A total of 54 distinct occupations come out in this section where 25 occupations were in existence in the industry before. However, a total of 29 new occupations have come out in this section. The 25 old occupations include: Accountant, Agent, Carpenter, Computer Operator, Driver, Cutter man, Electrician, Engineer, Fabricator, Fitter, Foreman, Helper, Lathe Machine Operator, Machine Man, Management/Manager, Marine Engineer, Molding Technician, Naval Architect/Architect, Painter, Sareng, Storekeeper, Stress Analyst, Supervisor, Technician, Welder.

The new 29 occupations include: 3 D Printing Technician, Advisor, Automation operation/supervision, Business Promoter, C & C Operator, CCTV Man, CNG Machine Operator, Compressor Man, Consultant, Designer, Driver, E-commerce, Grizer, Hydraulic Sack, Production In Charge, Khalashi, Loskor, Lower, Management Information System(MIS) officer, Marine Driver, Marketing Manager, MIG Machine Operator, Purchase Officer, Vessel Master, PRO, Researcher, Salvage Operator, Sand Blaster, Vacuum Infusion, Wince Operator.

Based on the frequencies of the occupations that are not currently employed in the enterprises but will be hired in the future to expand the business operations or cut costs, we report occupations that had more than 1% frequencies, that is, the occupations were mentioned by at least 2 enterprises. The rest of the occupations are put into the “Other” category. This criterion yields 26 distinct occupations.

Once again, the male-domination in the shipbuilding industry is observed in table 21. 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.

Table 21 Gender Preferences across BSCO Code 1-digit level Occupations needed for further expanding businesses or cutting costs (%)

Occupations BSCO-1	Male	Female	No Preference
Manager	90	0	10
Professional	82.35	0	17.65
Technician and associate professional	73.33	0	26.67
Clerical support staff	87.5	0	12.5
Technical workers	90.24	2.44	7.32
Factory and machine operators and machine assemblers	94.12	0	5.88
Primary profession	60	0	40
Total	85.38	0.77	13.85

Table 22 shows the qualification matrix with regard to the minimum educational qualification level expected of the future workforce - occupations required for future expansion or cutting costs. It shows that around 31% and 22% of future occupations will require Bachelor’s and Master’s degree, respectively.

Moreover, only 18% of the future occupation vacancies can be filled-up with SSC equivalent or below educational qualifications. These findings reflects the high importance of educational attainment for filling up the future occupational job vacancies.

Table 22 Occupations required for future expansion or cutting costs by Qualification Matrix -Minimum qualification level expected of the future workforce -Level of Education (%)

Occupations BSCO-1	Illiterate	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocation	Bachelor	Masters
Manager								60	40
Professional						14.71	2.94	32.35	50
Technician and associate professional			6.67	6.67	20	6.67		20	40
Clerical support staff				12.5	25	25		37.5	
Technical workers		2.44	19.51	14.63	2.44	26.83	7.32	26.83	
Factory and machine operators and machine assemblers		5.88	17.65	11.76	23.53	23.53		17.65	
Primary profession								60	40
Total		1.54	9.23	7.69	7.69	17.69	3.08	30.77	22.31

Table 23 reports the desired educational background and experience level for the future workforce required for the future expansion of the shipbuilding industry. It shows that more than half of the future job occupations demand applicants from the Science background (55%) to fill the future occupation vacancies in the shipbuilding industry. Moreover, it is reported that around 27% of the future occupations do not know which educational background employees they will need. At least 3 years of average job experience is mentioned to be the desired with minimum level of education. The manager's occupation category requires the highest (around 6 years) and the clerical support staff category requires the lowest (around 3 years) of average years of experience at the entry level to be desired minimum. It must be remembered that longer years of experiences at the entry level is desired only when the industry suffers from skill shortage.

Table 23 Desired Educational Background and Experience level for the future workforce required for the future expansion (%)

Occupations BSCO-1	Desired Minimum Qualifications				Desired Minimum Average Years of Experiences at the entry level
	Science	Arts	Commerce	Do not Know	
Manager	30		30	40	5.5
Professional	76.47	2.94	20.59		4.5
Technician and associate professional	80			20	4.6
Clerical support staff	12.5	62.5	25		2.75
Technical workers	53.66	4.88		41.46	3.59
Factory and machine operators and machine assemblers	35.29	5.88		58.82	4
Primary profession	20	60		20	5.2
Total	54.62	9.23	9.23	26.92	4.2

Table 24 reports the extent of difficulties in filling up the vacancies from Bangladesh and International market across BSCO Code 1-digit level occupations in the Shipbuilding Industry. Though the average level

of difficulties in filling the vacant positions with the Bangladeshi and International employees across the occupation categories do not vary significantly, the high level (7 to 10) of difficulty percentage to find the suitable employees from Bangladesh is far higher (42%) than from international market (19%). Almost the same results have been found if we consider extent of difficulties at 4-digit level of occupations (Table-25).

Table 24 Extent of difficulties in filing up the vacancies from Bangladesh and International Markets across BSCO Code 1-digit level occupations (%)

Occupations BSCO-1	Difficulty level to find the suitable employee from Bangladesh				Difficulty level to find the suitable employee from International Market			
	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager	0	40	60	6	0	100	0	6
Professional	2.94	70.59	26.47	6	11.76	76.47	11.76	5
Technician and associate professional	6.67	60	33.33	6	13.33	73.33	13.33	5
Clerical support staff	50	50	0	4	0	100	0	5
Technical workers	0	29.27	70.73	7	14.63	56.1	29.27	6
Factory and machine operators and machine assemblers	5.88	70.59	23.53	6	11.76	58.82	29.41	6
Primary profession	20	60	20	5	0	60	40	6
Total	6.15	52.31	41.54	6	10.77	70	19.23	6

2.11 Impacts of Hard-To-Fill Vacancies

These 16 occupations have “no to moderate” impact on Hard-To-Fill vacancies. These include 3D Printing Technician, Assistant Engineer, Computer Operator, Vacuum Infusion, Marketing Manager, Business Promotor, E-commerce Operator, Logistic, Send Blaster, Compressor Man, Vessel Master, Hydraulic Sack, Grinder, CNG Machine Operator, Deputy Manager/DGM and Finance Executive. Hence, the following occupations mentioned in the tables belong to the hard-to-fill category. This section deals with the impact of HARD-TO-FILL VACANCIES in the shipbuilding industry. done

The figures presented in Table 25 shows that whether a particular impact falls into how much high to very high category due to the hard-to fill vacancies for a particular occupation. Table 2.35 reports that the enterprises acknowledge high-to -very high impact (14%) like losing business or orders to competitors (National/International) because of hard-to-fill vacancies of manager while this particular impact results most from the hard-to-fill vacancies of technician and production related employees. Moreover, the table also shows that the enterprises bear high-to -very high impact like experiencing increased operating costs due to Mechanist, Auto machine engineer, Carpenter, CCTV Man, Director and production related employees. The rest of the interpretation of the figure follows:

Table 25 Impact of Hard-To-Fill Vacancies across BSCO Code 4-digit level Occupations (%)

Occupations BSCO Code 4-digit	Loss business or orders to competit ors (National / Internati onal)	Delay developing new products or services	Have difficulties meeting quality standard	Experience increased operating costs	Have difficulties in introducing new working practice	Increase workload for other staff	Outsourc e work	Withdraw from offering certain products or services altogether	Have difficultie s meeting customer service objective	Have difficulties introduc ing new working practice
Accountant	14.29		42.86	42.86	57.14			28.57		
Technician	100		50			50	100			50
Production	100		100	100	100	100			100	100
Welder	4		8	32	20	24	4	8		20
Painter	4.76	9.52		28.57	19.05	23.81				19.05
Machine Man	5.56	22.22	11.11	33.33	27.78	27.78	11.11	5.56		16.67
Electrician	6.25		12.5	31.25	12.5	6.25				12.5
Fitter	7.69	3.85	3.85	34.62	19.23	23.08		7.69		15.38
Crane Driver										
Engineer	11.76	17.65	11.76	29.41	35.29	35.29		11.76	5.88	35.29
Helper				35.71	14.29	7.14		14.29		14.29
Management/ Manager	17.86	7.14	17.86	28.57	28.57	28.57		14.29	7.14	25
Salvage Operator	50	50			50		100	50	50	50
Cutter man		7.14		35.71	14.29	14.29				7.14
Operator						50				
General Manager/GM				50	50	50		50	50	50
Supervisor				50				50		
Office Assistant						50				
Carpenter			50	100	100			50		
CCTV Man				100						
Director				100					100	
Fabricator		50								
Molding Technician			20	40	40		20	40	20	
C & C Operator		25	25		50		25	25	25	
Stress Analysis										
Auto Machine Engineer			100	100	100		100		100	
Foreman	9.09	9.09		9.09	9.09	18.18		9.09		18.18
Mechanist	100		100	100	100					
Lathe Machine Operator										100
Sareng	100	100	50	50	50				50	50
Chief Engineer				50				50		
Store keeper										
Technical Assistant					100			100		
Total	8.24	7.12	9.36	27.72	21.35	17.6	3.75	9.36	4.12	15.73

2.12 Actions Taken/will be Taken in the Near Future to Address Hard-To-Fill Vacancies

After discussing the impact of hard-to-fill vacancies, this study now reverts its focus on what actions should be taken or will be taken in near future to address hard-to-fill vacancies. Table 26 shows that increasing salaries could solve the hard-to-fill vacancy problem for most of the occupations. It may be argued that increased salaries might attract more skilled people towards the shipbuilding industry and the problem of hard-to-fill vacancy problem can be resolved to a greater extent. Moreover, redefining existing jobs and increasing and imparting training to the existing workforce involved in the shipbuilding industry has been widely proposed. Hence, these findings corroborate the idea that hard-to-fill vacancies arise due to the skill shortage, that is why, it is suggested widely to impart training to the existing labor force involved in the shipbuilding industry. Moreover, the purview of training should be extended to such a level where the newcomers in the market can avail themselves of the training facilities as well.

Table 26 Actions Taken/Will Be Taken In the Near Future To Address Hard-To-Fill Vacancies across BSCO Code 1-digit level Occupations (%)

Occupations BSCO-1	Percentages of enterprise taking/will take any actions in near future to address problems caused by hard-to-fill vacancies	Increasing salaries	Increasing the training given to your existing workforce	Redefining existing jobs	Increasing advertising/recruitment spend	Increasing / expanding training programs (e.g., partnership with local or international consultants/training institutes)	Using new recruitment methods or channels	Recruiting workers who are foreigners	Bringing in contractors to do the work, or contracting it out
Manager	95.12	53.85	64.1	51.28	33.33	53.85	28.21	0	43.59
Professional	90.91	70	63.33	50	30	40	36.67	3.33	50
Technician and associate professional	78.26	83.33	55.56	50	27.78	44.44	33.33	5.56	50
Clerical support staff	80	75	50	50	25	50	50	0	50
Technical workers	84.68	75.24	75.24	59.05	45.71	45.71	50.48	6.67	51.43
Factory and machine operators and machine assemblers	80	85	70	65	30	50	45	5	40
Primary profession	87.5	92.86	57.14	57.14	50	50	42.86	7.14	50
Total	86.14	73.48	68.26	56.09	38.7	46.96	42.61	4.78	48.7

Note: The Color indicates: =1st cause; =2nd cause; =3rd cause

2.13 Skill Gap

This study attempts to describe the nature and extent of skill gap existing in the shipbuilding industry. Table 27 illustrates the extent of Skill Gap across BSCO Code 1-digit level Occupations in the Shipbuilding

Industry. The average level of proficiency for each category of profession as well as the skill gaps are shown in Table 2.48. Considering 1-10 scale (1=No Proficiency and 10 = Highly proficient), 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), managers (2.51) etc.

Table 27 Level of Proficiency and Skill Gap across BSCO Code 1-digit level Occupations

Occupations BSCO-1	Level of Proficiency (%)			Mean (1-10 Scale)	Skill Gap (10 minus level of proficiency)
	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)		
Manager	0	37.76	62.24	7.49	2.51
Professional	0	37.74	62.26	7.25	2.75
Technician and associate professional	0	38.1	61.9	7.45	2.55
Clerical support staff	11.11	33.33	55.56	6.78	3.22
Service and sales staff	0	16.67	83.33	8.33	1.67
Technical workers	0.37	40.59	59.04	7.00	3
Factory and machine operators and machine assemblers	2.13	23.4	74.47	7.38	2.62
Primary profession	3.51	68.42	28.07	6.12	3.88
Total	0.86	40.65	58.49	7.09	2.91

To get a deeper understanding and take up policies to alleviate skill gap, the extent of Skill Gap across BSCO Code 4-digit level occupations in the Shipbuilding Industry has been presented in Table 28. This table is of particular interest to identify occupations which suffer most due to skill gap. It shows that helper, finance executive, mechanic, admin, painter working in the shipbuilding industry have high level of skill gap.

Table 28 Extent of Skill Gap across BSCO Code 4-digit level Occupations

Occupations BSCO-1	Name	Level of Proficiency (%)			Mean (1-10 Scale)	Skill Gap (10 minus level of proficiency)
		1 to 3	4 to 6	7 to 10		
Manager	Finance Executive	0	75	25	6.4	3.6
	Management/ Manager	0	40	60	7.5	2.5
Professional	Accountant	0	26	74	7.3	2.7
	Admin	0	33	67	6.7	3.3
	Engineer	0	50	50	7.2	2.8
	Naval Architect/Architect	0	0	100	7	3

Occupations BSCO-1	Name	Level of Proficiency (%)			Mean (1-10 Scale)	Skill Gap (10 minus level of proficiency)
		1 to 3	4 to 6	7 to 10		
Technician and associate professional	Foreman	0	67	33	6.9	3.1
Technical workers	Carpenter	0	40	60	6.8	3.2
	Cutter man	0	43	57	6.8	3.2
	Electrician	0	36	64	7.1	2.9
	Fitter	0	41	59	7.2	2.8
	Gas Cutter	0	25	75	7.3	2.7
	Grinder	0	0	100	7.9	2.1
	Painter	0	53	47	6.7	3.3
Factory and machine operators and machine assemblers	Welder	2	41	58	7	3
	Crane Driver	0	0	100	8.7	1.3
	Machine Man	0	25	75	7.4	2.6
	Mechanic	14	29	57	6.7	3.3
Primary profession	Operator	0	20	80	7.4	2.6
	Helper	4	78	17	5.7	4.3
	Other	1	26	73	7.7	2.3
	Total	1	41	58	7.1	2.9

2.14 Action Taken/Will Be Taken In Near Future to Address the Problems Of Skill Gap

Table 29 describes what actions should be/will be taken in the near future to address the problem of skill gap across BSCO code 1-digit level occupations in the shipbuilding industry. More supervision on staff training has been suggested for every category of the profession and occupies the number one actions to be taken. Moreover, more staff appraisals / performance reviews have also been widely suggested for addressing the problems.

Table 29 Actions Taken/Will Be Taken in Near Future to Address the Problem of Skill Gap across BSCO Code 1-digit level Occupations (%)

Occupations BSCO-1	Percentages of enterprise taking/ will take any actions in near future to address problems of Skill Gap	Increase training activity / spend or increase / expand trainee programs	Reallocating work	Increase recruitment activity / spend	More staff appraisals / performan ce reviews	Implementation of mentoring / buddying scheme	More supervision of staff	Recruiting workers who are foreigners	Changing working practice
Manager	75	74.07	66.67	14.81	85.19	59.26	92.59	0	51.85
Professional	71.43	66.67	60	33.33	80	46.67	86.67	13.33	26.67
Technician and associate professional	75	50	58.33	25	83.33	41.67	83.33	8.33	33.33
Clerical support staff	50	50	100	50	100	50	100	0	50

Occupations BSCO-1	Percentages of enterprise taking/ will take any actions in near future to address problems of Skill Gap	Increase training activity / spend or increase / expand trainee programs	Reallocating work	Increase recruitment activity / spend	More staff appraisals / performance reviews	Implementation of mentoring / buddying scheme	More supervision of staff	Recruiting workers who are foreigners	Changing working practice
Service and Sales Staff	100	100	0	0	100	0	100	0	0
Technical workers	89.91	89.8	84.69	59.18	97.96	22.45	98.98	2.04	45.92
Factory and machine operators and machine assemblers	100	80	70	20	100	20	100	0	80
Primary profession	92.31	86.11	88.89	44.44	100	22.22	100	2.78	52.78
Total	85.17	82.09	78.61	44.28	94.53	30.35	96.52	2.99	47.26

Note: The Color indicates: =1st action; =2nd action; =3rd action

2.15 Training and Skill Development

The economy of Bangladesh is growing steadily benefiting from reforms and increasing openness. Annual GDP growth has accelerated from 4.1% in the period FY1973-1978 to 6.2% in rY2008-2013. Excitingly, since FY 2015-16 Bangladesh has been experiencing more than 7.0% GDP growth which crossed 8.0% in 2018-19 that gives the country an aspiration to climb up to double digits. Literacy rate increased over the past decades, so did school enrollment and particularly girls and women's participation in education. Population and labor force is predominantly young with more than a third in the 15-34 age group in 2010. Bangladesh is well-placed to benefit from the demographic dividend up to 2050 and perhaps beyond due to decline in fertility rates which, combined with effective policies and markets, triggers faster rates of economic growth and human development. This may be reinforced by the growth of labor productivity through skills development and technological progress especially Information and Communication Technology (ICT) driven move towards a knowledge economy. However, skill is recognized after infrastructure and energy as the prime factor to industrial growth, productivity, export diversification and producing high value products. It needs to be mentioned here that the Asian Development Bank's (ADB) Bangladesh Country Partnership Strategy (for 2012-2016) identifies the low competitiveness of firms as a key constraint to growth particularly the low skills and low productivity of the workforce. To coordinate the existing skills development and training programs sporadically being implemented by about 23 ministries and divisions, the Government has formulated National Skills Development Policy, 2011 and 2021. To run the skills development programs in a holistic, coordinated and standardized way the Government has recently established National Skills Development Authority (NSDA) which will bring all skills development activities under one umbrella to ensure uniform quality and standard across the country. Side by side with the government's fiscal support to the skills development programs additional source of funding will be ensured through National Human Resource Development Fund (NHROF) which has already been established. Deserving public and private training institutes will benefit from this fund to carry on their training activities.

Skills for Employment Investment Program (SEIP)

Asian Development Bank (ADB) signed a Multi-tranche Financing Facility (MFF) Agreement with Bangladesh Government in 2014 in order to support long-term and comprehensive skills development efforts in Bangladesh assessing its potential contribution to higher GDP growth by skilling and up-skilling a large number of working age people in priority sectors. Swiss Agency for Development and Cooperation (SOC) has also co-financed the program in the first tranche. Finance Division is the executing agency of the SEIP project while three Ministries (Ministry of Expatriate Welfare, Education and Industries), Bangladesh Bank, PKSF and 13 Industry Associations are partnering with this Division. Apart from this, BRTC under the Ministry of Ministry Road Transport & Highways is working with this project to develop 1,00,000 trained and licensed drivers to drastically reduce road accidents. Support to Skills Development Coordination and Monitoring Unit (SDCMU) is working as the implementing agency. The Skills Development Coordination and Monitoring Unit (SDCMU) is headed by the Executive Project Director who is assisted by 04 Deputy Executive Project Directors, 10 Assistant Executive Project Directors and a team of Specialists. A Project Management Unit (PMU) is also working at Finance Division headed by Finance Secretary. Policy issues are dealt by the PMU alongside overall supervision of the project. ADB and SDC have been jointly financing the first tranche of the program and the industry associations are also sharing a percentage of the total cost. SDC is, however, not financing the second and third tranche activities due to their internal policy changes. The total cost of the SEIP project for the entire period for all three tranches (2014 to 2024) is estimated at BDT 3712.33 crore.

SEIP is imparting training in skills which are relevant for many sectors and for both domestic and overseas employment. SEIP has been currently supporting some priority sectors. Few more sectors will come up when the implementation of the Tranche 3 starts. Under these priority sectors SEIP is partnering with 13 industry associations and also with the public training institutes alongside some semi-government and autonomous bodies like PKSF, BB-SME etc. Regarding shipbuilding sector, Association of Export Oriented Shipbuilding Industries of Bangladesh (AEOSIB) is responsible for conducting the training. Under Tranche 1 and 2, the following training programs on different courses and course categories (i.e New EntrantsNE and Up-Skilling-US) have been conducted.

Table 30 Course Wise Training Summary of Association of Export Oriented Shipbuilding Industries of Bangladesh & Tranche 1

Course Name	Target	Enrollment		Assessment			Certification	Job Placement	
		Total	Of Which Female	Total	Absent	Dropout		Total	Percentage (%)
Welding & Fabrication (NE)	4,115	4,054	48	3,867	144	43	3,366	2,585	76.80
Welding & Fabrication (US)	48	48	-	47	1	-	36	36	100.00
Machine Tools Operation (NE)	1,058	1,058	140	994	56	8	923	735	79.63
Machine Tool Operation (US)	14	14	-	13	1	-	13	13	100.00
Electrical & Navigation Equipment Installation (NE)	1,216	1,216	99	1,185	23	8	1,034	736	71.18
Electrical & Navigation Equipment Installation (US)	34	34	-	34	-	-	32	32	100.00
Machinery Installation	270	258	2	247	9	2	225	160	71.11
Painting	270	270	6	267	2	1	242	239	98.76
Piping	540	376	3	332	41	3	293	250	85.32
Total	7,565	7,328	298	6,986	277	65	6,164	4,786	77.64

Source: SEIP

Table 31 Course Wise Training Summary of Association of Export Oriented Shipbuilding Industries of Bangladesh & Tranche 2

Course Name	Target	Enrollment		Assessment			Certification	Job Placement	
		Total	Of Which Female	Total	Absent	Dropout		Total	Percentage (%)
Electrical & Navigation Equipment Installation	1,770	1,770	200	1,689	20	61	1,578	1,161	73.57
Machine Tools Operation	1,050	1,050	92	981	18	51	940	653	69.47
Ship Painting	175	175	3	171	4	-	165	120	72.73
Ship Piping	255	255	11	222	3	30	194	136	70.10
Ship Machinery Installation	200	200	1	186	2	12	171	138	80.70
Welding & Fabrication	1,550	1,550	40	1,454	21	75	1,419	1,016	71.60
Total	5,000	5,000	347	4,703	68	229	4,467	3,224	72.17

Source: SEIP

From tables 30 and 31, we have found that there are 77.64% job placement in tranche 1 and 72.17% in tranche 2.

Training Information from Survey

SEIP, and Technical and Vocational Education and Training (TVET) institutions etc. have been conducting training on a large number of occupations. A total of 20 training programs including the SEIP's were arranged for the people who worked in the shipbuilding industry in Bangladesh. Around 72% of all the training programs lasted for less than 1 week. Longer duration training, which exceeds a month, constitutes around 12% of all training programs. The interesting fact involves the percentages of trainees who have been approved leave for attending the training. Table 32 shows that roughly one-quarter of the trainees enjoy full leave for attending the training program while 40% of the trainees get partial leave. More importantly, around 36% of the trainees do not get leave at all for attending any training session. The overall picture indicates that the workers in the shipbuilding industry are not encouraged to attend training session which deters them from acquisition of required and the latest skills needed for this sector.

Table 32 Training that were arranged for employees of this enterprises over the last two years (%)

Name of the Training	Number of Training Held	Duration of the training					Percentages of workers who got leave for the training		
		< 1 week	1-2 weeks	3-4 weeks	1-3 months	4-6 months	Fully	Partially	None
Induction	1	100						100	
Management	1	0			100			100	
Production	1	0			100			100	
Mechanical Training	2	50				50	50	50	
Basic Training	7	100						100	
Functional Welding	1	100							100
Drawing Training	1	100							100
Technical Training	1	100							100
Functional Training	8	75		12.5	12.5		62.5		37.5
Electrical Training	5	40	40		20		40		60

Name of the Training	Number of Training Held	Duration of the training					Percentages of workers who got leave for the training		
		< 1 week	1-2 weeks	3-4 weeks	1-3 months	4-6 months	Fully	Partially	None
Safety Training	17	82.35	11.76	5.88			5.88	41.18	52.94
Machine Operation	3	66.67		0	33.33		33.33	33.33	33.33
Salvage Training	1	100		0				100	
Works Elements Training	2	50		50			50	50	
Equipment Training	1	100						100	
Modern Technology Use	1	0	100				100		
PMC	1	0			100			100	
ISO	2	100							100
Ship Construction	1	0		100			100		
Fire Safety Training	1	100		0			100		
Total	58	72.41	8.62	6.9	10.34	1.72	24.14	39.66	36.21

Table 33 illustrates the number of training participants and amount spent on training (in lac taka) for the employees of this enterprise over the last two years. The number of participants in training over the last two years (2018, 2019) remain almost the same. Naturally, the participants are male as this sector is male-dominated. The table 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 indicates lack of willingness of the enterprises to spend money for arranging the training programs. Another interesting fact is revealed by the percentage of training participants who received certificates. It shows that participants of functional training, electrical training, safety training, machine operation and basic training do not receive any certificates while the participants of more technical training arranged for the white-collar employees are provided with certificates.

Table 33 Number of Training Participants and Amount of money Spent on Training (in Lac Taka) for the employees of this enterprise over the last two years

Name of the Training	Number of people Received Training in 2018		Number of people Received Training in 2019		Amount spent for arranging the Training (Lac Taka)		Percentage of Training Participants who received Certificate
	Male	Female	Male	Female	2018	2019	
Induction	4	1			0.50		100
Management	4	1			0.70		100
Production			3	1		0.50	100
Mechanical Training	10		23	1		0.70	50
Basic Training	37		45		2.80	2.60	42.86
Functional Welding	4		5		0.50	0.50	
Drawing Training	4		5		0.10	0.10	
Technical Training	30		40		1.00	1.00	

Name of the Training	Number of people Received Training in 2018		Number of people Received Training in 2019		Amount spent for arranging the Training (Lac Taka)		Percentage of Training Participants who received Certificate
	Male	Female	Male	Female	2018	2019	
Functional Training	86		150		2.70	0.04	25
Electrical Training	303		307		0.38	0.35	20
Safety Training	440	6	369	6	0.38	0.35	35.29
Machine Operation	10	1	9		2.00	0.35	33.33
Salvage Training	4		7			0.50	
Works Elements Training	50		10		12.50	0.50	
Equipment Training			7			0.40	
Modern Technology Use	12					4.00	100
PMC			1			0.14	100
ISO	10		13		1.20	1.20	100
Ship Construction			10			5.00	100
Fire Safety Training			25			1.00	
Total	1008	9	1029	8	24.75	19.21515	37.93

Table 34 reports that the trainers of the training sessions held over the last two years (in 2018 and 2019) are mostly from the factory. It shows that around 74% of the training in 2018 was conducted by the Internal Trainers of the factory while this figure rose to around 79% in 2019. The share of training program conducted by the External Trainers in the factory/premise has fallen down significantly during the above two periods.

Table 34 Trainers of the Training Sessions Held over the Last Two Years in the Factory

Name of the Training	2018			2019		
	Internal Trainer in the factory/premise	Internal Trainer outside the factory	External Trainer in the factory/premise	Internal Trainer in the factory/premise	External Trainer in the factory/premise	External Trainer outside the factory
Basic Training	100			100		
Drawing Training	100					
Electrical Training	100			100		
Equipment Training				100		
Fire Safety Training				100		
Functional Welding				100		
Functional Training	100			80	20	
Induction	100					
ISO			100		100	
Machine Operation	100			100		
Management	100			100		
Modern Technology Use			100			
PMC			37.5			100
Production				100		
Safety Training	50	12.5		77.78	22.22	
Salvage Training				100		
Ship Construction					100	
Technical Training	100		18.52			
Works Elements Training	50	50				
Total	74.07	7.41	18.52	78.57	17.86	3.57

Table 35 shows the most important training needed on the occupations for the shipbuilding industry. It seems that some training programs like functional trainings etc. overlap across the BSCO 1-digit level occupations. This overlapping occurs because of the same training required for various occupations like welder, electrician (technical workers), machine man (factory and machine operators and machine assemblers) and helper (primary profession). This table is of particular interest as it charts what training should be organized to get rid of the skill shortage and skill gap problem existing in the shipbuilding industry of Bangladesh. For example, for the managerial level employees, management training is found to be of particular importance (40%) while Functional Training (23%) is found to be the most important training for the technical workers. Safety training is of pivotal importance for the primary profession employees.

Table 35 The Most Important Trainings Needed across Occupations

Occupations BSCO-1	Name of the Training	(%)
Manager	Management	40
	Measurement Training	20
	Production Management	20
	Office Management	20
Professional	Ship Construction	66.67
	Fitting Training	33.33
Technician and associate professional	Basic Training	20
	Induction	6.67
	Mechanical Training	6.67
	Drawing Training	6.67
	Electrical Training	6.67
	Safety Training	6.67
	Equipment Training	6.67
	Project Scheduling	6.67
	Project Execution	6.67
	Molding Training	6.67
	Ship Design	6.67
	Marine Design	6.67
	Boat Lifting Training	6.67
	Technical workers	Functional Training
Electrical Training		14.52
Safety Training		8.87
Painting Training		8.87
Electrical Training		8.06
Drawing Training		5.65
Cutter Training		5.65
Works Elements Training		4.84
Basic Training		4.03
Mechanical		1.61
Workshop Training		1.61

Occupations BSCO-1	Name of the Training	(%)
	TIG	1.61
	Basic Accounting	0.81
	Machine Operation	0.81
	Line Operating	0.81
	Tools Operating	0.81
	Power Box Operating	0.81
	Functional Training	0.81
	Line Maintenance Training	0.81
	Auto Function Training	0.81
	Foundation Training	0.81
	Modern Technology Use	0.81
	Production Management	0.81
	MIG	0.81
	Surface Preparation Training	0.81
	Plate Branding	0.81
	Conformation Design	0.81
Factory and machine operators and machine assemblers	Mechanical	22.73
	Safety Training	18.18
	Functional Training	13.64
	Machine Operation	13.64
	Drawing Training	4.55
	Auto Machine Operating	4.55
	Crane Operating	4.55
	Hydraulic Machine Operating	4.55
	Auto Function Training	4.55
	Fabrication Designing	4.55
	Driving	4.55
Primary profession	Safety Training	30
	Functional Training	20
	Works Elements Training	20
	Mechanical	10
	Electrical Training	10
	Ship Construction	10

Table 36 The Most Important Trainings Needed across Occupations in the Shipbuilding Industry (BSCO code 4-digit level) (%)

Occupation Name BSCO code 1-digit level	Occupation Name BSCO code 4-digit level	Name of the Training	%
Professional	Accountant	Induction	33.3
		Functional Accounting	33.3
		Fitting Training	33.4

Occupation Name BSCO code 1-digit level	Occupation Name BSCO code 4-digit level	Name of the Training	%
Technician and associate professional	Technician	Induction	11.1
		Basic Training	11.1
		Technical Training	11.1
		Functional Training	11.1
		Safety Training	11.1
		Auto Machine Operating	22.2
		Equipment Training	11.1
		Parts Set up Training	11.1
Technical workers	Welder	Management	1.3
		Mechanical	1.3
		Adopting Training	1.3
		Basic Training	5.1
		Innovation Training	1.3
		Functional Welding	3.8
		Functional Training	34.2
		Electrical Training	3.8
		Safety Training	12.7
		Ship Welding	1.3
		Gas Welding	2.5
		Works Elements Training	6.3
		Cutter Training	1.3
		Auto Function Training	1.3
		Finisher Training	1.3
		Under Water Welding	1.3
		Workshop Training	1.3
		Modern Technology Use	3.8
		Fabricator	1.3
		Production Management Training	1.3
TIG	5.1		
MIG	6.3		
Architecture Training	1.3		
Technical workers	Painter	Management	3.7
		Basic Training	3.7
		Drawing Training	14.8
		Safety Training	14.8
		Works Elements Training	3.7
		Workshop Training	3.7
		Painting Training	51.9
		Surface Preparation Training	3.7

Occupation Name BSCO code 1-digit level	Occupation Name BSCO code 4-digit level	Name of the Training	%
Factory and machine operators and machine assemblers	Machine Man	Mechanical	8.0
		Basic Training	4.0
		Operational Training	4.0
		Functional Training	12.0
		Basic Accounting	4.0
		Electrical Training	4.0
		Safety Training	16.0
		Machine Operation	12.0
		Auto Machine Operating	8.0
		Line Operating	4.0
		Functional Training	4.0
		Equipment Training	8.0
		Hydraulic Machine Operator	4.0
		Auto Function Training	4.0
Workshop Training	4.0		
Technical workers	Electrician	Management	3.4
		Mechanical	3.4
		Basic Training	3.4
		Drawing Training	3.4
		Functional Training	6.9
		Electrical Training	34.5
		Safety Training	17.2
		Line Operating	3.4
		Power Box Operator	3.4
		Generator Operator	3.4
		Circuit Box Operator	3.4
		Works Elements Training	3.4
		Panel Board Training	3.4
		Line Maintenance Training	3.4
Power House	3.4		
Technical workers	Fitter	Management	1.5
		Mechanical	3.0
		Basic Training	3.0
		Drawing Training	4.5
		Functional Training	4.5
		Basic Accounting	3.0
		Electrical Training	34.8
		Marketing	1.5
Safety Training	13.6		

Occupation Name BSCO code 1-digit level	Occupation Name BSCO code 4-digit level	Name of the Training	%
		Salvage Training	3.0
		Tools Operating	1.5
		Functional Training	1.5
		Works Elements Training	6.1
		Cutter Training	1.5
		Grinding Training	1.5
		Workshop Training	1.5
		Foundation Training	1.5
		Plate Formation Training	1.5
		Modern Technology Use	4.5
		Fabricator	1.5
		Ship Design	1.5
		Plate Branding	1.5
		Conformation Design	1.5
Factory and machine operators and machine assemblers	Crane Driver	Auto Machine Operating	33.3
		Crane Operating	33.3
		Line Operating	33.3
Professional	Engineer	Ship Construction	100.0
Primary profession	Helper	Mechanical	5.6
		Technical Training	5.6
		Functional Training	11.1
		Electrical Training	5.6
		Safety Training	33.3
		Functional Training	5.6
		Works Elements Training	16.7
		Cutter Training	5.6
		Measurement Training	5.6
		Ship Construction	5.6
Manager	Management/Manager	Management	40.0
		Measurement Training	20.0
		Workshop Training	20.0
		Production Management Training	20.0
Technical workers	Cutter man	Basic Training	8.3
		Safety Training	16.7
		Auto Machine Operating	8.3
		Cutter Training	58.3
		Measurement Training	8.3
Factory and machine operators and machine assemblers	Operator	Mechanical	50.0
		Machine Operation	50.0

Occupation Name BSCO code 1-digit level	Occupation Name BSCO code 4-digit level	Name of the Training	%
Factory and machine operators and machine assemblers	Wince Operator	Management	33.3
		Safety Training	33.3
		Works Elements Training	33.3
Manager	Finance Executive	Measurement Training	33.3
		Office Management	33.3
		Computer	33.3
Factory and machine operators and machine assemblers	Fabricator	Drawing Training	25.0
		Functional Training	25.0
		Fabricator	25.0
		Fabrication Designing	25.0
Technician and associate professional	PMC	Project Scheduling	40.0
		Monitoring	20.0
		Project Execution	40.0
Technician and associate professional	Ship Design	Molding Training	50.0
		QC	50.0
Technician and associate professional	Marine Engineer	Mechanical	20.0
		Marine Design	40.0
		Ship Design	20.0
		Basic of Marine Technology	20.0
Technician and associate professional	Foreman	Electrical Training	100.0
Factory and machine operators and machine assemblers	Mechanic	Mechanical	42.9
		Functional Training	14.3
		Electrical Training	28.6
		Machine Operation	14.3
Technical workers	Plumber	Electrical Training	50.0
		Plumbing	50.0
Technician and associate professional	Assistant Engineer	Basic Training	50.0
		Drawing Training	50.0
Technician and associate professional	Junior Engineer	Workshop Training	50.0
		Ship Design	50.0
Technical workers	Hydraulic Machine Operator	Machine Operation	100.0
Technician and associate professional	Sareng	Basic Training	25.0
		Safety Training	25.0
		Modern Technology Use	25.0
		Boat Lifting Training	25.0
Technician and associate professional	Safety Officer	Safety Training	100.0
	Grizer	Safety Training	50.0

Occupation Name BSCO code 1-digit level	Occupation Name BSCO code 4-digit level	Name of the Training	%
Factory and machine operators and machine assemblers		Driving	50.0
Factory and machine operators and machine assemblers	Khalashi	Safety Training	100.0

Table 37 illustrates the willingness of enterprises to fund the training programs across occupations in the shipbuilding industry. It shows 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 training arrangement partially.

Table 37 Willingness of Enterprises to Fund the Training Programs across Occupations (%)

Occupations BSCO-1	Fully	Partially	Not at all
Manager	60.00	40.00	
Professional		100.00	
Technician and associate professional	43.75	31.25	25.00
Technical workers	24.64	51.45	23.91
Factory and machine operators and machine assemblers	27.27	59.09	13.64
Primary profession	7.69	76.92	15.38
Total	25.63	53.27	21.11

2.16 Extent of Automation, Labor Displacement and Training

Table 38 shows the extent of automation technology in the next 5-10 years and the resultant extent of job displacement across BSCO code 1-digit level occupations in the shipbuilding industry. The enterprises think that automation technology will replace around 60% of the technicians and associate professionals and 50% of the primary profession jobs in the next 5-10 years. Consequently, 75% of the primary profession employees and 60% of the technicians and associate professional employees belonging to the high level of job displacement due to the upcoming automation technology in the next 5-10 years (see, Table 2.58 and Figure 2.3, and 2.4). Table 2.60 also gives the similar figures for BSCO code 4-digit level occupations. Production drawing, ship design, molding technicians etc. will be replaced around 100 % (high level).

Table 38 Extent of Automation Technology in the next 5-10 years and the resultant extent of Job displacement across BSCO Code 1-digit level Occupations (%)

Occupations BSCO-1	To what extent this occupation is subject to automation technology in next 5-10 years				Due to automation, what will be the extent of job displacement			
	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager		100		4.5	50	50		3.5
Professional		100		5.2		100		4.5
Technician and associate professional	20	20	60	6.8		40	60	6.6
Clerical support staff		100		6.0		100		5.0
Technical workers	7.02	75.44	17.54	5.4	9.65	54.39	35.96	5.7
Factory and machine operators and machine assemblers		85.71	14.29	4.9		100		4.1
Primary profession	25	25	50	7.3		25	75	7.0
Total	7.19	74.1	18.71	5.5	8.63	57.55	33.81	5.6

Table 39 illustrates the extent of repetitive work and percentages of enterprises that have plan to train their workers to embrace automated technology across BSCO code 1-digit level occupations in the shipbuilding industry. Table 2.46 shows that around 40% of the technicians and associate professionals, 18% technical workers, and 14% of the factory and machine operators and machine assemblers perform high level (1 to 3) of routine or repetitive tasks. 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 plans to train their workers to embrace automated technology in the 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.

Table 39 Extent of Repetitive Work and Percentages of Enterprises that have plans to train their workers to embrace automated technology across BSCO Code 1-digit level Occupations (%)

Occupations BSCO-1	Extent of routine/repetitive work				Percentages of Enterprises that have plan to train its workers to embrace automated technology
	1 to 3 (High level Repetition)	4 to 6 (Medium level Repetition)	7 to 10 (Low level Repetition)	Mean	
Manager		100		4.5	100
Professional	33.33	66.67		4.5	100
Technician and associate professional	40	40	20	4.2	100
Clerical support staff		100		6.0	100

Occupations BSCO-1	Extent of routine/repetitive work				Percentages of Enterprises that have plan to train its workers to embrace automated technology
	1 to 3 (High level Repetition)	4 to 6 (Medium level Repetition)	7 to 10 (Low level Repetition)	Mean	
Technical workers	17.54	60.53	21.93	5.2	79.82
Factory and machine operators and machine assemblers	14.29	85.71		4.4	100
Primary profession		75	25	6.3	25
Total	17.99	62.59	19.42	5.1	81.29

Figure 4 Extent of Automation that will take place in the next 5-10 years in the Occupations (%)

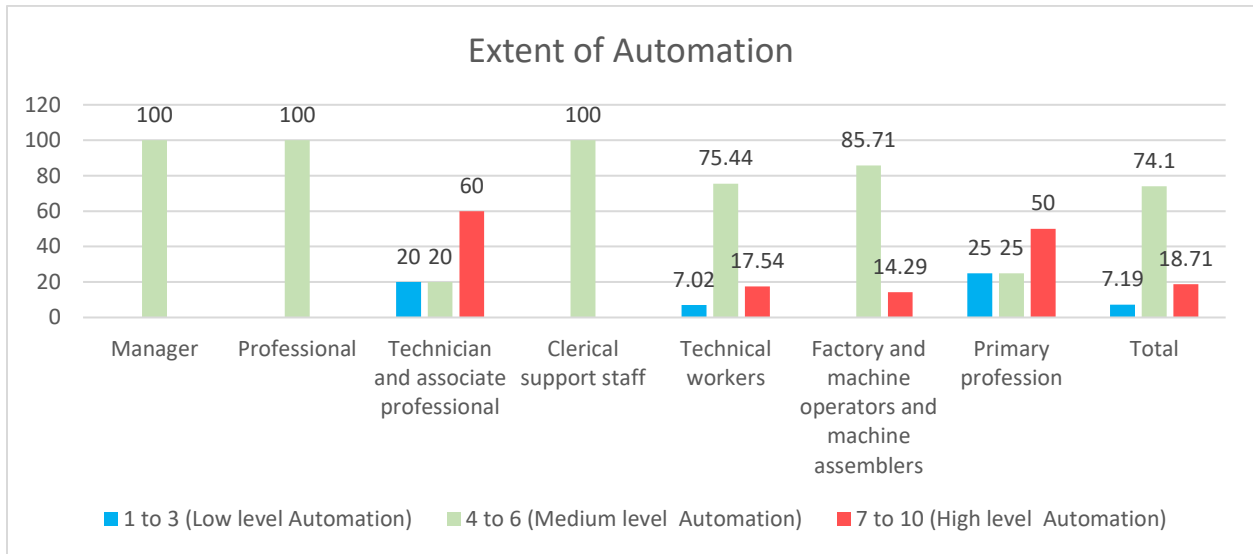
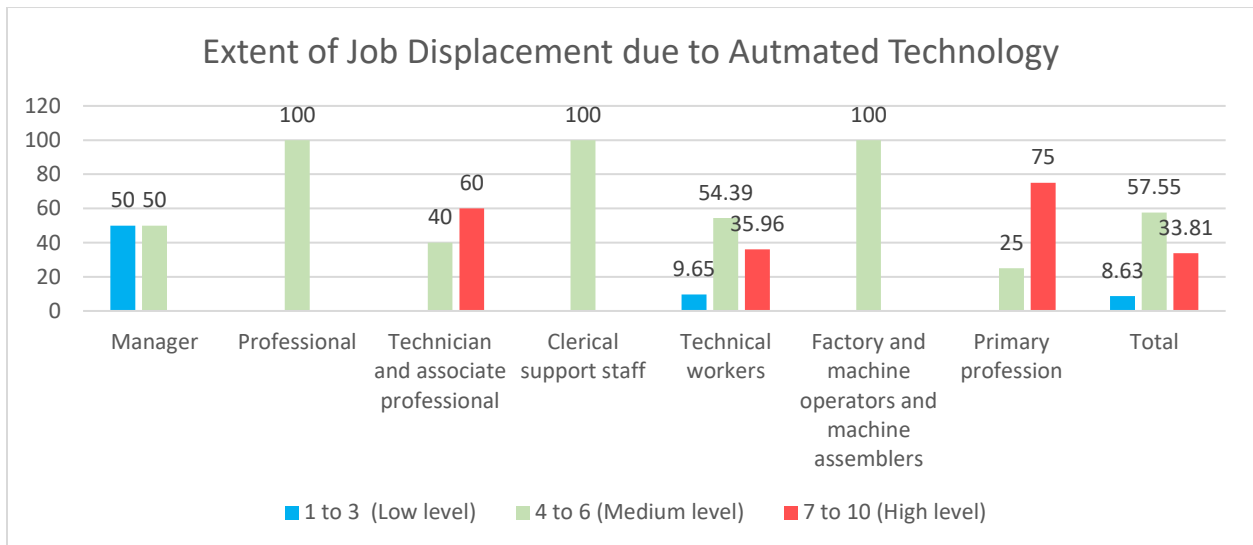


Figure 5 Extent of Job Displacement due to Automated Technology that will take place in the next 5-10 years in the Occupations (%)



2.17 Labor Demand Projection for the Next 10 Years (For Existing Occupations)

This section discusses the labor demand projection for the next 10 years for the existing occupations. Table 40 reports the extent of average growth in labor demand in the next 5-10 years across BSCO code 1-digit level occupations in the shipbuilding industry. It shows 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 labour 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 more labour for employment in the industry and this statement is corroborated by the views of the enterprises who view that overall, there will be 63% moderate growth and 25% high growth in labour demand in next 10 years.

Table 40 Extent of Average Growth in Labor Demand in the next 5-10 years across BSCO Code 1-digit level Occupations (%)

Occupations BSCO 1-digit	No Growth	Moderate Growth	High Growth	Very high growth
Manager	31.52	64.13	4.35	0
Professional	18	76	6	0
Technician and associate professional	17.95	69.23	12.82	0
Clerical support staff	33.33	66.67	0	0
Service and Sales Staff	66.67	33.33	0	0
Technical workers	0.4	60.8	38.4	0.4
Factory and machine operators and machine assemblers	4.88	70.73	24.39	0
Primary profession	9.26	50	35.19	5.56
Total	11.09	62.85	25.32	0.74

Table 41 illustrates the level of employment and the projected number of job growth across BSCO code 1-digit level occupations in the shipbuilding industry. 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 by 2025 from current stage and the same figure rose to around 87% in 2030. It indicates overwhelming prospect of the shipbuilding industry of Bangladesh. Automation will not replace job fully. So, despite automation, job growth can occur. The Level of employment and the projected number of Job Growth for BSCO Code 4-digit level occupations is shown in table 41.

Table 41 Level of Employment and the projected number of Job Growth across BSCO Code 1-digit level Occupations

Occupations 1-digit	Level of Employment				Growth (%) with respect to current level of employment		
	Current	By 2023	By 2025	By 2030	By 2023	By 2025	By 2030
Manager	291	322	370	461	10.7	27.1	58.4
Professional	269	285	323	394	5.9	20.1	46.5

Occupations 1-digit	Level of Employment				Growth (%) with respect to current level of employment		
	Current	By 2023	By 2025	By 2030	By 2023	By 2025	By 2030
Technician and associate professional	146	174	205	258	19.2	40.4	76.7
Clerical support staff	25	38	42	54	52.0	68.0	116.0
Service and Sales Staff	26	31	35	40	19.2	34.6	53.8
Technical workers	4114	5046	6439	7985	22.7	56.5	94.1
Factory and machine operators and machine assemblers	492	615	805	1024	25.0	63.6	108.1
Primary profession	1345	1596	1993	2343	18.7	48.2	74.2
Total	6708	8107	10212	12559	20.9	52.2	87.2

2.18 Coping Mechanism with Covid-19 Impacts

Enterprise/ firm respondents were asked some issues to understand the coping mechanism of covid 19. Table 42 indicates these issues. They were asked whether they have received any benefit from the government during Covid time. Only 5 % responded positively . Respondents were again asked whether they have received any assistance other than from the Government or not. In this case also, 28.33% stated that they have received some kind of assistance. They were again asked whether they have faced difficulty to get efficient labor. Surprisingly, only 13.33 percent respondents stated that they have faced such difficulties. Again, regarding the issue whether they think the demand for new kind of skills has increased in covid situations or not, only 6.67% responded positively . So, it can be concluded that although they did not receive much assistance , they tried to adjust this situation with hard labor and other supports. Demands for new skills have also been increased during covid-19, because they expected more production to compensate for their losses during covid-19 situation.

Table 42 Coping Mechanism with Covid-19

Issues related coping mechanism	Yes		No	
	N	%	N	%
Whether they have received any benefit from the government	3	5.00	57	95.00
Whether they have received any assistance rather than Government	17	28.33	43	71.67
Whether they have faced difficulty to get efficient labor	8	13.33	52	86.67
Whether they think the demand for new kind of skills has increased in covid situations	4	6.67	56	93.33

Chapter 3: Findings from the Employee Survey

Employee Survey

We know that if the skill is very firm-specific, or transferable across only a small number of firms, wages may not rise as much as the productivity of the trained workers, and hence the firm can appropriate some of the returns from these skills. In such cases, the firm has a greater incentive to invest in an employee acquiring the skill. Skill Gaps are typically measured by the information perceived by the employer on skill insufficiencies among the workers in a firm. However, similar perception-based information is also collected from the employees themselves on their skills and expertise.

So, 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 or upgrade skills. We have picked two employees from each occupation/task in consultation with the manager in such a way that one is skilled and the other is unskilled in manager’s view since the manager/employer knows best about the level of skill of his or her workers.

As stated earlier, this study covers 60 factories from 04 divisions: Dhaka, Barishal, Chittagong, Khulna. 30 factories are located in rural areas, while the rest 30, are situated in the urban areas. From these, a total of 867 employees are surveyed. To obtain related information, employees were asked some issues regarding their current occupation and occupation history, academic performance, vocational training, need for training, job progression at the current enterprise, self assessed skill & skill demand, extent of formality, employee's job satisfaction, health status, impact of covid-19 and coping mechanism etc.

3.1 Salient Socio-economic Characteristics

Table 43 summarizes the salient characteristics of the respondents (employees). Findings from the table suggest that the average age of the respondents is 32.64 years. Among the respondents 97.58% are male and 2.42 % are female. Regarding religion, 95.73% are Muslims followed by Hindus(4.15%) and others (0.12%).Average family size of the respondents is 4.51 persons. In case of average monthly income, personal income is Tk. 29,067 where household income is Tk.39,942 .

Table 43 Salient Socio-economic Characteristics

Age (mean)	Sex(%)		Religion(%)			Family size (mean)	Monthly Personal Income (mean) Tk.	Monthly Household Income (mean) Tk.
	Male	Female	Islam	Hinduism	Others			
32.64	97.58	2.42	95.73	4.15	0.12	4.51	29067	39942

3.1 Education

Table 44 provides distribution of the respondents/employees by educational level. As we have collected information of employees who have passed at least primary school certificate, we have found 99 employees have not passed at least primary school certificate. So among 768 respondents, it is seen that more than one-thirds (34%) of the respondents passed primary level, 35% of the 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's degree and 5.73% of them completed master's degree.

Table 44 Distribution of the respondents by educational level

Primary school certificate (PSC)		JSC		SSC		HSC		Diploma (completed)		Bachelor (completed)		Master (completed)		Total	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
266	34.64	271	35.29	73	9.51	44	5.73	35	4.56	35	4.56	44	5.73	768	100

Moreover, table-45 to table 51 provide distribution of the respondents for different employee categories (BSCO-1digit level occupation category and we consider here only those which have responses) by educational level. Regarding primary school certificate passed (from Table-3.3) it is seen that most of the employees completed their education in bangla medium. For all categories, around 70 to 80 percent of their educational institutions are located in rural areas (except professionals, it is 42%). Majority of the Institutions are found government for all categories.

Table 45 Academic Performance/ educational level (Primary School Certificate Passed) (%)

Occupation Category	Type of Exam				Location		Type of the Institution		
	Bangla Medium	English Medium	TVET	Madrasah	Rural	Urban	Govt.	Private	NGO & Others
Managers	100.0	0.0	0.0	0.0	85.7	14.3	100.0	0.0	0.0
Professionals	100.0	0.0	0.0	0.0	42.9	57.1	78.6	14.3	7.1
Technicians and associate professionals	100.0	0.0	0.0	0.0	87.5	12.5	87.5	12.5	0.0
Clerical support staff	100.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	0.0
Craft workers & plant operators	96.6	0.0	0.0	3.4	73.7	26.3	88.4	10.8	.9
Plant and machine operators, and assemblers	100.0	0.0	0.0	0.0	69.4	30.6	91.9	8.1	0.0
Elementary occupations	100.0	0.0	0.0	0.0	87.0	13.0	82.6	17.4	0.0
All	97.6	0.0	0.0	2.4	74.3	25.7	88.5	10.6	.9

If we consider junior school certificate passed from Table 46, we also found that most of the employees completed their education in Bangla medium. For all categories, around 70 to 75 percent of their educational institutions are located in rural areas (except managers and professionals, who are 50% and 21% respectively). Majority Institutions have been found government for managers, technicians and associate professionals categories, but it has been found private (71%) in case of professionals.

Table 46 Academic Performance/ educational level (Junior School Certificate Passed) (%)

Occupation Category	Type of Exam				Location		Type of the Institution		
	Bangla Medium	English Medium	TVET	Madrasa	Rural	Urban	Govt.	Private	NGO & Others
Managers	100.0	0.0	0.0	0.0	50.0	50.0	64.3	35.7	0.0
Professionals	92.9	0.0	0.0	7.1	21.4	78.6	28.6	71.4	0.0
Technicians and associate professionals	92.0	0.0	0.0	8.0	72.0	28.0	84.0	16.0	0.0
Craft workers & plant operators	97.2	0.0	.5	2.3	72.9	27.1	55.3	44.7	0.0
Plant and machine operators, and assemblers	100.0	0.0	0.0	0.0	75.0	25.0	58.5	39.0	2.4
Elementary occupations	96.9	0.0	0.0	3.1	75.0	25.0	71.0	29.0	0.0
All	97.1	0.0	.3	2.6	70.1	29.9	58.5	41.2	.3

If we consider secondary school certificate passed from Table 47, we will also see that most of the employees completed their education in bangla medium. There exists variations in in locations of the educational institutions for all categories, but it comprises 16% to 75% in rural areas and 25% to 83% in urban areas. In case of professionals, majority (83%) of them have been seen passed from urban areas. About 50% and 66% of them have been found passed from government institutions particularly the managers, technicians and associate professionals categories, but it has been found that 75% of the professionals have passed from the private institutions.

Table 47 Academic Performance/ educational level (Secondary School Certificate Passed) (%)

Occupation Category	Type of Exam				Location		Type of the Institution		
	Bangla Medium	English Medium	TVET	Madrasa h	Rural	Urban	Govt.	Private	NGO & Others
Managers	94.4	0.0	0.0	5.6	55.6	44.4	50.0	50.0	0.0
Professionals	91.7	0.0	0.0	8.3	16.7	83.3	25.0	75.0	0.0
Technicians and associate professionals	100.0	0.0	0.0	0.0	44.4	55.6	66.7	33.3	0.0
Craft workers & plant operators	98.5	0.0	0.0	1.5	66.7	33.3	62.1	37.9	0.0

Occupation Category	Type of Exam				Location		Type of the Institution		
	Bangla Medium	English Medium	TVET	Madrasha	Rural	Urban	Govt.	Private	NGO & Others
Plant and machine operators, and assemblers	100.0	0.0	0.0	0.0	75.0	25.0	44.4	55.6	0.0
Elementary occupations	100.0	0.0	0.0	0.0	41.7	58.3	66.7	33.3	0.0
All	97.6	0.0	0.0	2.4	56.8	43.2	56.3	43.7	0.0

If we consider higher secondary certificate passed from Table 48, we will see that most of the employees completed their education in Bangla medium. Regarding the locations, the situation is different from previous cases. For all categories, more than 62 percent of their educational institutions are located in urban areas (except for Craft workers & plant operators which is 55%). Majority of the Institutions have been found government for all categories.

Table3.6: Academic Performance/ educational level (Higher Secondary Certificate Passed) (%)

Table 48 Academic Performance/ educational level (Higher Secondary Certificate Passed) (%)

Occupation Category	Type of Exam				Location		Type of the Institution		
	Bangla Medium	English Medium	TVET	Madrasha	Rural	Urban	Govt.	Private	NGO & Others
Managers	100.0	0.0	0.0	0.0	33.3	66.7	71.4	28.6	0.0
Professionals	92.9	0.0	0.0	7.1	35.7	64.3	57.1	42.9	0.0
Technicians and associate professionals	100.0	0.0	0.0	0.0	37.5	62.5	87.5	12.5	0.0
Clerical support staff	100.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0
Craft workers & plant operators	100.0	0.0	0.0	0.0	45.2	54.8	83.9	16.1	0.0
Plant and machine operators, and assemblers	100.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0
Elementary occupations	100.0	0.0	0.0	0.0	16.7	83.3	83.3	16.7	0.0
All	98.8	0.0	0.0	1.2	36.6	63.4	76.8	23.2	0.0

If we consider Diploma completed from Table 49, we will see that most of the employees completed their education in Bangla medium. An overwhelming majority of the respondents for all categories passed from the government institutions. Majority of the institutions have been found government for all categories.

Table 49 Academic Performance/ educational level (Diploma completed) (%)

Occupation Category	Subject			Duration of the course				Type of the Institution	
	Science	Arts	Commerce	1 year	2 years	3 years	4 years	Govt.	Private
Managers	83.3	0.0	16.7	0.0	0.0	16.7	83.3	100.0	0.0
Professionals	81.8	0.0	18.2	0.0	9.1	27.3	63.6	90.9	9.1
Technicians and associate professionals	85.7	14.3	0.0	0.0	14.3	0.0	85.7	100.0	0.0
Craft workers & plant operators	93.3	0.0	6.7	33.3	20.0	6.7	40.0	26.7	73.3
Plant and machine operators, and assemblers	100.0	0.0	0.0	80.0	0.0	0.0	20.0	0.0	100.0
Elementary occupations	100.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0
All	88.9	2.2	8.9	20.0	11.1	11.1	57.8	62.2	37.8

If we consider Bachelor's degree completed from Table 50, we can see that there exist variations regarding their subject (science/arts/commerce) for all categories, but it is almost the same (around 30%) if we see aggregate level (Full sample). Majority of the Institutions have been found government for all categories.

Table 50 Academic Performance/ educational level (Bachelor degree completed) (%)

Occupation Category	Subject			Duration of the course				Type of the Institution	
	Science	Arts	Commerce	1 year	2 years	3 years	4 years	Govt.	Private
Managers	21.7	39.1	39.1	4.3	30.4	21.7	43.5	73.9	26.1
Professionals	52.9	11.8	35.3	0.0	23.5	17.6	58.8	64.7	35.3
Technicians and associate professionals	40.0	40.0	20.0	10.0	0.0	10.0	80.0	100.0	0.0
Craft workers & plant operators	0.0	0.0	100.0	0.0	0.0	50.0	50.0	100.0	0.0
Plant and machine operators, and assemblers	0.0	100.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0
Elementary occupations	0.0	100.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0
All	33.3	31.5	35.2	3.7	20.4	18.5	57.4	77.8	22.2

If we consider Master’s degree completed from Table 51, we find that majority of the respondents obtained commerce degree for all categories except technicians and associate professionals where 50% are science and 50% are commerce degree holders. Majority of the institutions have been found government for all categories.

Table 51 Academic Performance/ educational level (Master’s degree completed) (%)

Occupation Category	Subject			Duration of the course				Type of the Institution	
	Science	Arts	Com merc e	1 year	2 years	3 years	4 years	Govt.	Private
Managers	22.6	3.2	74.2	48.4	41.9	3.2	6.5	74.2	25.8
Professionals	0.0	7.1	92.9	71.4	14.3	0.0	14.3	85.7	14.3
Technicians and associate professionals	50.0	0.0	50.0	50.0	50.0	0.0	0.0	100.0	0.0
Craft workers & plant operators	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0
Plant and machine operators, and assemblers	100.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0
Elementary occupations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	18.4	6.1	75.5	53.1	36.7	2.0	8.2	79.6	20.4

3.2 Training

The respondents were asked whether they attended vocational training or not. Moreover, training related other important information has also been collected. Tables 3.10 to 3.13 illustrate the information. From table 3.10, we found that about half of the respondents attended vocational training in case of managers, professionals, plant and machine operators, and assemblers, and clerical support staff categories. In case of technicians and associate professionals, craft workers & plant operators and elementary occupations, these are 37%, 35.2% and 17.8% respectively.

Table 52 Whether they attended vocational training (%)

Occupation Category	Ever attended vocational Training?	
	Yes	No
Managers	48.1	51.9
Professionals	47.2	52.8

Occupation Category	Ever attended vocational Training?	
	Yes	No
Technicians and associate professionals	37.0	63.0
Clerical support staff	50.0	50.0
Service and sales workers	0.0	0.0
Skilled agricultural, forestry and fishery workers	0.0	0.0
Craft workers & plant operators	35.2	64.8
Plant and machine operators, and assemblers	54.4	45.6
Elementary occupations	17.8	82.2
All	37.6	62.4

Table 53 illustrates some training related information which was not arranged by the employers. If we consider duration of the course, there exists variation among different occupation categories. The duration of course (more than 6 months) has been found 100% in case of clerical support staff. An overwhelming majority of the respondents for all categories have certificates and also have training certified by BTEB. More than three-fifths of the respondents bear expenditure by 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 on the scale in all categories).

Table 53 Vocational training information (not arranged by the employers) (%)

Occupation Category	Duration of the course						Having certificate		Certified by BTEB		Expenditure borne by				Satisfaction regarding quality 1= Not satisfied, 10= Fully satisfied
	< 1 week	1-2 weeks	3-4 weeks	1-3 months	4-6 months	>6 months	Yes	No	Yes	No	Self	Govt.	NGO & Others	Others	Mean
Managers	20.0	14.5	5.5	43.6	10.9	5.5	90.9	9.1	52.7	47.3	72.7	20.0	3.6	3.6	8.64
Professionals	3.6	0.0	28.6	10.7	28.6	28.6	89.3	10.7	76.0	24.0	64.3	14.3	14.3	7.1	8.18
Technicians and associate professionals	0.0	4.8	9.5	14.3	23.8	47.6	100.0	0.0	71.4	28.6	66.7	33.3	0.0	0.0	8.33
Clerical support staff	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	100.0	0.0	50.0	0.0	50.0	0.0	8.00
Craft workers & plant operators	3.1	4.9	17.8	22.7	13.5	38.0	86.5	13.5	69.6	30.4	67.5	7.4	18.4	6.7	7.96

Occupation Category	Duration of the course						Having certificate		Certified by BTEB		Expenditure borne by				Satisfaction regarding quality 1= Not satisfied, 10= Fully satisfied
	< 1 week	1-2 weeks	3-4 weeks	1-3 months	4-6 months	>6 months	Yes	No	Yes	No	Self	Govt.	NGO & Others	Others	Mean
Plant and machine operators, and assemblers	0.0	10.3	12.8	7.7	17.9	51.3	76.9	23.1	64.9	35.1	48.7	12.8	30.8	7.7	7.82
Elementary occupations	0.0	0.0	30.0	40.0	10.0	20.0	100.0	0.0	90.0	10.0	60.0	10.0	10.0	20.0	7.80
All	5.3	6.6	15.7	23.3	15.4	33.6	87.7	12.3	67.5	32.5	65.4	12.6	15.7	6.3	8.10

Table 54 illustrates some training related information which was arranged by the employers. If we consider duration of the course, there also exists variation among different occupation categories. If we consider overall situation, about half of respondents completed less than one-week training followed by 1-2 weeks (23.3%), 1-3 months (11.3%), 3-4 weeks (10.8%), 4-6 months (2.0%) and more than 6 months (1.6%). Regarding satisfaction, they are almost satisfied with the quality of training (more than 7 on the scale in all categories).

Table 54 Vocational training information (arranged by the employers) (%)

Occupation Category	Duration of the course						Expenditure borne by				Having certificate		Satisfaction regarding quality 1= Not satisfied, 10= Fully satisfied
	< 1 week	1-2 weeks	3-4 weeks	1-3 months	4-6 months	>6 months	Self	Govt.	NGO & Others	Others	Yes	No	
Managers	48.8	16.3	11.6	20.9	0.0	2.3	53.5	11.6	16.3	18.6	48.8	51.2	8.24
Professionals	61.1	16.7	11.1	0.0	11.1	0.0	83.3	0.0	16.7	0.0	22.2	77.8	8.00
Technicians and associate professionals	26.7	40.0	26.7	0.0	0.0	6.7	73.3	6.7	20.0	0.0	40.0	60.0	7.73
Clerical support staff	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0	8.00
Craft workers & plant operators	51.2	24.1	10.0	10.6	2.4	1.8	78.2	2.9	18.8	0.0	37.6	62.4	7.87
Plant and machine operators, and assemblers	58.5	14.6	7.3	19.5	0.0	0.0	97.6	0.0	2.4	0.0	26.8	73.2	7.87
Elementary occupations	31.3	50.0	12.5	6.3	0.0	0.0	75.0	0.0	25.0	0.0	37.5	62.5	7.56
All	50.5	23.3	10.8	11.8	2.0	1.6	77.4	3.6	16.4	2.6	36.7	63.3	7.91

Moreover, the respondents were asked about their opinion regarding need for training. Table 55 indicates the responses. From the table, overall, 62.1% expressed that training is needed to increase skill, 62.4% stated 'training is needed for career progression', and 73.4% stated 'training is needed to adapt with the technological change'. The respondents were again asked about their opinion - to what extent they think that their jobs will be taken away by automation. The result (5.5) indicates slightly in favor of replacing their jobs.

Table 55 Need for Training (%)

Occupation Category	Training needed increase your skill?		Training needed for carrier progression?		Training needed to adapt with the technological change?		Opinion on extent of Automation replacing job? 1= Won't be taken away 10= Will completely be taken away
	Yes	No	Yes	No	Yes	No	
Managers	64.2	35.8	64.2	35.8	66.7	33.3	4.59
Professionals	69.8	30.2	69.8	30.2	67.9	32.1	4.81
Technicians and associate professionals	63.0	37.0	64.8	35.2	75.9	24.1	4.50
Clerical support staff	25.0	75.0	25.0	75.0	50.0	50.0	5.50
Craft workers & plant operators	59.8	40.2	60.2	39.8	71.1	28.9	5.79
Plant and machine operators, and assemblers	69.6	30.4	69.6	30.4	73.4	26.6	5.32
Elementary occupations	63.0	37.0	63.0	37.0	79.5	20.5	5.82
All	62.1	37.9	62.4	37.6	71.6	28.4	5.50

3.3 Self Assessed Skill & Skill Demand

The respondents were asked about some issues regarding self-assessed skill & skill demand. Table 56 indicates their opinion regarding these issues. If we see the overall results of their opinions regarding the issues indicated in first row of the table, we found the result 7.19 on the scale (close to highly proficient) in assessing level of proficiency in performing job. Similarly, their opinions regarding help in performing the job by formal education and training are around 6.0 which indicates moderate results. They think that their experience in this enterprise has increased skill and their skills have market demand in current industry and outside the industry as the result is close to 7 on the scale. They also opined that it would be difficult (6.06) if they want to leave this job to find a similar/ better job.

Table 56 Self Assessed Skill & Skill Demand

Occupation category	How do you assess your level of proficiency in performing your job? (1= No Proficiency, 10= Highly Proficient)	How do you think your formal education helps to perform your work proficiently? (1= Not at all, 10= Fully)	How helpful is your trainings (not arranged by the employers) in performing your work proficiently? (1= Not at all, 10= Fully)	How helpful is your trainings (arranged by the employers) in performing your work proficiently? (1= Not at all, 10= Fully)	Do you think your experience in this enterprise has increased your skill? (1= Not at all, 10= Fully)	How do you assess the market demand of your skill in the industry you are working? (1= No demand, 10= High demand)	How do you assess the market demand of your skill outside the industry you are working? (1= No demand, 10= High demand)	If you want to leave this job now how difficult will it be to find a similar/ better job? (1= No difficulties, 10= Very difficult)
Managers	7.65	7.54	6.61	6.59	7.59	7.38	7.37	5.85
Professionals	7.43	7.62	6.10	6.15	7.42	7.11	7.00	6.02
Technicians and associate professionals	7.70	7.52	6.92	6.55	6.94	7.46	7.41	5.74
Clerical support staff	5.75	6.00	5.75	6.75	6.50	6.00	5.75	6.75
Craft workers & plant operators	7.15	6.68	5.82	5.83	6.89	6.99	7.02	6.14

Occupation category	How do you assess your level of proficiency in performing your job? (1= No Proficiency, 10= Highly Proficient)	How do you think your formal education helps to perform your work proficiently? (1= Not at all, 10= Fully)	How helpful is your trainings (not arranged by the employers) in performing your work proficiently? (1= Not at all, 10= Fully)	How helpful is your trainings (arranged by the employers) in performing your work proficiently? (1= Not at all, 10= Fully)	Do you think your experience in this enterprise has increased your skill? (1= Not at all, 10= Fully)	How do you assess the market demand of your skill in the industry you are working? (1= No demand, 10= High demand)	How do you assess the market demand of your skill outside the industry you are working? (1= No demand, 10= High demand)	If you want to leave this job now how difficult will it be to find a similar/ better job? (1= No difficulties, 10= Very difficult)
Plant and machine operators, and assemblers	7.14	7.06	6.00	6.03	6.89	6.91	6.99	6.10
Elementary occupations	6.59	6.45	5.95	6.08	6.79	6.78	6.84	5.95
All	7.19	6.88	6.01	6.01	6.98	7.04	7.05	6.06

3.4 Extent of Formality

Table 57 to 60 also attempt to explain the extent of formality with respect to some issues like type of the contract of the employee, weekly paid leave, weekly holidays etc. If we consider contract, 57.3 percent employees informed that their contracts are oral. Considering extent of formality with respect to weekly paid leave, 84% stated that they get one holiday followed by two or more than two holidays. Regarding paid leaves, about 69% reported that they get weekly holidays followed by sick leave (37.9%), casual leave (33.6%), maternity/paternity leave ((14.2%) and others(6.6%). On the other hand, considering unpaid leaves, 38% reported that they get sick leave followed by casual leave(34.8%), weekly holidays(33.2%), maternity/paternity leave((23.5%) and others(16.3%).

Table 57 Extent of Formality (%)

Occupation category	Type of the contract of the employee		How many weekly paid leave do you get?			Which of the following paid leaves do you get?									
	Written	Oral	One day	Two days	More than 2 days	Weekly holidays		Sick leave		Casual leave		Maternity/ Paternity leave		Others	
						Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Managers	65.4	34.6	76.5	16.0	7.4	91.4	8.6	69.1	30.9	55.6	44.4	21.0	79.0	13.8	86.2
Professionals	67.9	32.1	90.6	5.7	3.8	94.3	5.7	66.0	34.0	62.3	37.7	22.6	77.4	26.8	73.2
Technicians and associate professionals	59.3	40.7	81.5	18.5	0.0	79.6	20.4	53.7	46.3	46.3	53.7	16.7	83.3	2.7	97.3
Clerical support staff	50.0	50.0	100.0	0.0	0.0	100.0	0.0	50.0	50.0	50.0	50.0	0.0	100.0	0.0	100.0
Craft workers & plant operators	36.1	63.9	84.7	14.5	.8	61.8	38.2	28.3	71.7	27.2	72.8	13.6	86.4	4.9	95.1
Plant and machine operators, and assemblers	36.7	63.3	87.3	11.4	1.3	75.9	24.1	57.0	43.0	36.7	63.3	5.1	94.9	6.5	93.5
Elementary occupations	39.7	60.3	83.6	16.4	0.0	57.5	42.5	19.2	80.8	20.5	79.5	13.7	86.3	0.0	100.0
All	42.7	57.3	84.3	14.2	1.5	68.7	31.3	37.9	62.1	33.6	66.4	14.2	85.8	6.6	93.4

Table 58 Extent of Formality (%) Contd.

Occupation category	Which of the following unpaid leaves do you get?									
	Weekly holidays		Sick leave		Casual leave		Maternity/Paternity leave		Others	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Managers	37.0	63.0	45.7	54.3	35.8	64.2	19.8	80.2	3.5	96.5
Professionals	26.4	73.6	37.7	62.3	32.1	67.9	13.2	86.8	10.0	90.0
Technicians and associate professionals	13.0	87.0	31.5	68.5	22.2	77.8	33.3	66.7	13.2	86.8
Clerical support staff	25.0	75.0	50.0	50.0	50.0	50.0	0.0	100.0	0.0	100.0
Craft workers & plant operators	37.1	62.9	38.6	61.4	36.1	63.9	24.7	75.3	20.5	79.5
Plant and machine operators, and assemblers	31.6	68.4	43.0	57.0	40.5	59.5	24.1	75.9	10.0	90.0
Elementary occupations	23.3	76.7	24.7	75.3	28.8	71.2	20.5	79.5	13.2	86.8
All	33.2	66.8	38.1	61.9	34.8	65.2	23.5	76.5	16.3	83.7

Considering benefit, it can be found that very low proportion of respondents stated that they receive pension, life insurance, health insurance, loan and other benefits which indicate that they do not get these kind of benefits much.

Table 59 Extent of Formality(%) Contd.

Occupation category	Which of the following benefits do you get?									
	Pension		Life insurance		Health insurance		Loan		Others	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Managers	3.7	96.3	14.8	85.2	11.1	88.9	43.2	56.8	12.7	87.3
Professionals	9.4	90.6	9.4	90.6	11.3	88.7	24.5	75.5	10.0	90.0
Technicians and associate professionals	1.9	98.1	1.9	98.1	3.7	96.3	22.2	77.8	7.9	92.1
Clerical support staff	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Craft workers & plant operators	4.4	95.6	4.4	95.6	3.3	96.7	26.2	73.8	5.4	94.6
Plant and machine operators, and assemblers	2.5	97.5	7.6	92.4	10.1	89.9	32.9	67.1	6.3	93.7
Elementary occupations	8.2	91.8	2.7	97.3	0.0	100.0	35.6	64.4	5.4	94.6
All	4.6	95.4	5.7	94.3	4.8	95.2	28.7	71.3	6.6	93.4

If we see overtime and hourly wage, about 81 % mentioned that they got overtime and 78% mentioned that they got paid for overtime. About 56.6% mentioned that hourly wage for overtime is the same as normal wage (hourly) where 28.7% and 14.7% mentioned higher and less respectively than the normal wage. Regarding laying off, majority of the respondents (92%) informed that the enterprise does not inform them in advance before laying off.

Table 60 Extent of Formality(%) Contd.

Occupation category	Do you work overtime?		Do you get paid for working overtime?		If yes, Hourly wage compared to the hourly(normal)			Does the enterprise inform you in advance before laying off?	
	Yes	No	Yes	No	Less	Same	Higher	Yes	No
Managers	49.4	50.6	34.6	65.4	12.5	37.5	50.0	92.6	7.4
Professionals	60.4	39.6	41.5	58.5	19.2	65.4	15.4	98.1	1.9
Technicians and associate professionals	74.1	25.9	70.4	29.6	7.9	60.5	31.6	94.4	5.6
Clerical support staff	100.0	0.0	100.0	0.0	25.0	50.0	25.0	100.0	0.0
Craft workers & plant operators	87.0	13.0	86.4	13.6	12.6	57.9	29.5	89.5	10.5
Plant and machine operators, and assemblers	91.1	8.9	88.6	11.4	25.7	45.7	28.6	100.0	0.0
Elementary occupations	84.9	15.1	83.6	16.4	19.7	63.9	16.4	93.2	6.8
All	81.3	18.7	77.9	22.1	14.7	56.6	28.7	91.9	8.1

3.5 Employee's Job Satisfaction

Table 61 attempts to explain the employee's job satisfaction with respect to some issues mentioned in the table. Although there exists some variation across responses in all issues, 'slightly agree' response is dominant compared to other responses for all issues except the issues relating to 'supervisor' knowledge', 'following ToR' and 'congenial relationship with colleagues. In these three cases, 'strongly agree' response is the highest.

Table 61 Employee's Job Satisfaction (%)

Issues Regarding employee's job satisfaction	Responses				
	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree
I feel I am paid adequately for the work I do.	15.0	23.4	11.4	43.9	6.2
I am satisfied with my job prospect/ promotion/ salary increase	8.9	25.7	17.2	41.6	6.6
My supervisor/boss is knowledgeable about my work	0.7	11.6	16.1	27.9	43.6
I am satisfied with my workplace safety / workplace environment	2.2	8.5	18.0	48.6	22.7
The benefits I receive are as good as what most other firms offer (Competitive salary package)	3.3	26.3	25.4	36.9	8.1
My employers offer me training opportunities	18.3	15.7	24.6	28.7	12.7
My employers care for my career advancement	5.0	22.5	26.6	35.6	10.3
My work assignments are fully explained (ToR is followed)	1.6	8.0	14.5	37.3	38.6
My relationship with my colleagues is congenial	0.6	1.8	7.6	30.8	59.2
There are rewards/ appreciation for hard working	3.8	19.3	22.6	31.6	22.7

3.6 Impact of Covid-19 and Monthly Indicators of Recovery

Since Covid-19 pandemic hit Bangladesh in 2020 and the government-imposed lockdown almost everywhere 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. So, to determine the impact, respondents were asked some questions regarding some indicators of recovery and other issues. Table 62 and 63 attempt to explain the situation.

Table 62 Impact of Covid-19 and Monthly Indicators of Recovery

Month (2020)	Degree of Economic Hardship 1= I didn't face any economic hardship 10 = I faced extreme economic hardship	Household expenditure related to January (%)					Degree of Anxiety 1=Not anxious at all 10=Very anxious
	Mean (Scale of 1 to 10)	Increased Moderately	Increased Significantly	Remained the same	Decreased Moderately	Decreased Significantly	Mean (Scale of 1 to 10)
January	4.18	43.00%	1.30%	54.10%	1.60%	0.00%	3.78
February	4.23	49.80%	9.60%	38.60%	2.00%	0.00%	3.95
March	4.62	46.60%	11.90%	33.40%	7.70%	0.30%	4.84
April	6.05	31.00%	28.40%	17.10%	20.50%	3.00%	6.34
May	6.37	29.80%	30.60%	15.10%	20.60%	3.90%	6.68
June	6.35	29.60%	29.80%	19.10%	18.00%	3.50%	6.67
July	5.72	32.60%	21.90%	27.20%	17.10%	1.20%	5.98
August	5.32	32.10%	18.10%	35.10%	14.50%	0.20%	5.54
September	5.15	31.10%	17.50%	37.90%	12.90%	0.50%	5.23

From table 62, it is found that number of employed persons declined in April 2020 which is the initial stage of lockdown and then it has started increasing over time. The salary and HH income also decreased during covid-19 lockdown time. Personal Loan has increased during this period, so it can be concluded that covid -19 has an impact over the income of the employee.

Table 63 Impact of Covid-19 and Monthly Indicators of Recovery

Month (2020)	Employed (%)			Salary	HH Income	Loan (%)	
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No
January	99.7	0	0.3	19604.29	27332.17	10	90
February	99.2	0.6	0.2	19447.47	27154.1	1.3	98.7
March	72	25.1	2.9	18506.94	25605.91	4.5	95.5

Month (2020)	Employed (%)			Salary	HH Income	Loan (%)	
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No
April	14.8	30	55.2	17508.13	21432.68	20.4	79.6
May	22.1	21.5	56.4	17834	21100.54	16.6	83.4
June	35.3	16.4	48.3	17845.78	21311.67	13	87
July	76.6	12.2	11.2	18837.02	24073.08	8.5	91.5
August	88.8	10	1.2	18372.37	24726.14	4.2	95.8
September	93.5	5.9	0.6	18546.05	26344.44	3.2	96.8

If we consider degree of economic hardship during this time, we found that they faced moderate economic hardship as it is visible from 6.05 to 6.35 on a scale of 10. Considering household expenditure compared to that of January,2020, around one third reported 'increased moderately' or 'increased significantly' which was covered by loan. If we consider their degree of anxiety, it increased significantly during the lockdown time.

3.7 Coping Mechanism with Covid-19

The respondents were asked some issues to understand the coping mechanism. Table 3.18 shows these issues. They were asked whether they have received any benefit from the government during this time. Only 6.57% gave positive answers. The respondents were again asked whether they have received any assistance other than Government or not. In this case only 12.92% stated that they have received some kind of assistance from outside the govt.. They were again asked whether they were employed during the last 7 months (April 2020 to November 2020) in any job other than his job. Only 3.23 percent respondents are employed in other jobs. So, we have concluded that Covid-19 has significant impact on their livelihood as coping mechanism is not seen satisfactory.

Table 64 Coping Mechanism of Covid-19

Issues related coping mechanism	Yes		No	
	N	%	N	%
Whether they have received any benefit from the government	57	6.57	810	93.43
Whether they have received any assistance rather than Government	112	12.92	755	87.08
Whether they were employed during the last 7 months (April 2020 to November 2020) in any job other than his job	28	3.23	839	96.77

Chapter 4: Findings from Key Informant Interview, Conclusion and Recommendations

As stated earlier ten KIIs have been conducted to understand the situation and problems of this sector. Para 4.1 includes the results of the KIIs.

4.1 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 for doing the job due to proper educational background/degree, lack of proper skills of doing the job due to lack of specialized training and the curricula of the educational institutions are not job oriented. Moreover, some graduates of Marine Engineering/related subjects leave the country every year that creates skill gap in this sector. Done
- Proper training institutes for employees are needed, and standardized quality training should be developed and imparted. 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. Some courses are needed to be implemented under shipbuilding sector in mid-level operations such as Ship Building Works' Drawing and Advance Welding (5g, 6g, TIG, MIG). done
- 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 circulated 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. done
- There has been an increased demand for various kinds of ships worldwide, and Bangladesh can be important destination of this market. As Bangladesh has proved itself to be a new and favorable destination for building ships, many foreign buyers are knocking at our doors. Hence, demand for skilled labor will increase two times or three times (on average) within five and ten years respectively. done
- We have to import some raw materials, and sometimes the prices are too high to afford these. If government helps by providing 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 logistic challenges because heavy industries like shipbuilding require constant maintenance and port facilities to perform heavy engineering and high-tech work.
- Since a lot of investment is needed in the shipbuilding industry, the government must formulate a policy for extending long-term loans at the lowest rate of interest to ensure competitiveness in

the 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. done

- We have some skilled and low cost workforce with expertise in building ships. As our country is a riverine country, we have the advantage of building yards on river banks. Our satisfactory weather condition also permits 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 make use of this advantage in the future.
- Due to COVID-19 pandemic, some enterprises have shut down operations of their factories and some have partial operations. Some have faced problems with workers' attendance or getting skilled workers. So, it causes negative impact on the industry, and the firms could not continue their production, and lost orders from the buyers. done

Table 65 List of Representative for KIIs

No.	Name	Designation and Organization/Association	Contact No.
1	Capt. Mohammed Habibur Rahman	Chief Coordinator (AEOSIB-SEIP)	+8801713110139
2	Md. Salah Uddin Khan	President Greater Khulna Dockyard Owners' Association	+8801715146099
3	Md. Shahidul Islam Bhuiyan	Vice-president Ship Owners' Association, Keraniganj	+8801919696865
4	Md. Habibur Rahman	Representative/Member (On behalf of the President) Bangladesh Shipbuilders' Association	+8801716322369
5	Fazlul Hoque Chowdhury	Vice-President Greater Khulna Dockyard Owners' Association	+8801711312581
6	Md. Belayet Hossain	General Secretary Greater Khulna Dockyard Owners' Association	+8801711271835
7	Mr. Uttam Ghosh	DGM FMC Dockyard Ltd.	+8801971362020
8	Mrs. Nasrin Sarwar	Director Prantik Marine Services	+8801730004278
9	ABM Mahbubur Rashid	Managing Director Metacenter Ltd. Shipyard	+8801713240913
10	Md. Salim Tarique	Coordinator-Training, Monitoring & Assessment (AEOSIB-SEIP)	+8801817403042

4.2 Overall Findings from the Survey

The present study focuses on the current situation of shipbuilding sector in terms of skill shortage and skill demand and projects future skill needs. The most important findings revealed by survey of enterprises/employees are the following:

- This study distinctly analyzes 20 major occupations because of their employment shares exceeding 0.5% in the total employment in the industry. According to this criterion, technical worker category of the BSCO code 1-digit occupation level includes 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 job 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. done
- 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 was 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 the same and varies widely across occupation categories.
- White-collar job holders like managers, professionals etc. undergo less physical labor 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 demands 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 take more than a month and more than a week but less than a month, respectively. This finding reflects accentuation of 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 labor. 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. Least 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 when the preference for newly created occupations constitute less than 1% female preference.
- Around 31% and 22% of the future occupations will require Bachelor’s and Master’s 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. done
- 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 the 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 on the part of enterprises to spend money for arranging the training programs. Another interesting fact is revealed by the percentage of training participants who received certificates. It shows that for functional training, electrical training, safety training, machine operation and basic training, participants do not receive any certificates while the more technical training arranged 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 Trainers 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 the 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 labour 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. 63% respondents gave their opinion in favour of moderate growth and 25% for 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 52% employment growth by 2025 from current stage and the same figure rose to around 87% by 2030. It indicates the overwhelming prospect of the shipbuilding industry of Bangladesh.
- From the employee survey, it is seen that more than one-third (34%) of the respondents passed primary level, 35% of the respondents passed JSC level, 9.51 % passed SSC, 5.73 % passed HSC and 4.56 % obtained diploma certificates. Moreover, about 4.56 % of the respondents completed bachelor's degree and 5.73% of the respondents completed master's degree. An overwhelming majority of the respondents for all categories have certificates and also have training certified by BTEB. More than three-fifths of the respondents bear the training expenditure by themselves (self) in most occupation categories while these are half in case of clerical support staff, plant and machine operators, and assemblers' categories. Regarding satisfaction, they are almost satisfied with the quality of training (more than 7 on the scale in all categories).
- The employees think that their experience in this enterprise has increased skills and their skills have market demand in current industry and outside the industry as the result is close to 7 on the scale. They also argued that it would be difficult (6.06), if they want to leave this job, to find a similar/ better job. It is also found that the number of employed persons declined in the month of April 2020 which was the initial stage of lockdown and then the employment increased over time. The salary and HH income also decreased during covid-19 lockdown time. As a consequence personal loan increased during this period. So it can be concluded that covid -19 has an impact over income of the employees.

4.3 Conclusion and Recommendations

Shipbuilding Industry is an important economic and growing industrial sector in Bangladesh. However, despite being marked by the government as a strategic industry for growth, the shipbuilding industry has not yet been meeting performance expectations. A slowdown in the global economy combined with infrastructural limitations have restrained the growth of industry. At present in the absence of backward linkage facilities, most of the accessories are imported, and the manufacturers are only able retain the labor costs and shipyard profit. Bangladesh has the potentiality to revolve into a hub of shipbuilding in the global context for small and medium-sized vessels within short time. This study has provided estimates of demand for skills at present and arrived at some projections for the next five/ten years. The study discussed the issues like comparative changes in employment, job growth (+)/ loss, extent of formality, desired occupation, extent of difficulties in filling up the vacancies, skill shortage, skill gaps etc. to understand the situation. It has also discussed the role of the existing training system in meeting the skills requirement of the country. 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 centres to train up entrepreneurs/workers on how to produce international standard ship products.
- Improve linkages between TVET and enterprises and also with different institutions (training, research and academic) and establish high-level coordination platforms in this regard.
- Support backward linkages of the industry and incorporate skills training relevant to market needs through involving the private sector in institutional management.
- Incorporate steps to encourage the technological advancement for sustainable development of the industry as automation is an 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 (shipbuilding, 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 Lloyd) and Bureau Veritas (BV) assessing the trainees here). This assessment is globally accepted which enhances the trainee's salaries both in domestic and overseas employment. So, emphasis should be given on obtaining international certification to increase domestic and overseas employment.

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Annexes

Annex (Section 2.3)

Table 66 Total Employment and Average Age of the Workers by Occupations

BSCO Code 1-digit Occupations Title	Occupation Name BSCO Code 4-digit	Male	Female	Total Employment	Average Age of the workers
Manager	Management/Manager	140	1	141	40
	Finance Executive	56		56	29
Professional	Accountant	66		66	35
	Admin	61		61	30
	Engineer	83	8	91	37
	Naval Architect/Architect	36	7	43	31
Technician and associate professional	Foreman	51	0	51	37
Technical workers	Welder	1402	10	1412	31
	Painter	556	93	649	32
	Electrician	272		272	31
	Fitter	1014	2	1016	32
	Cutter man	295		295	31
	Grinder	250		250	28
	Carpenter	113		113	29
	Gas Cutter	55		55	33
Factory and machine operators and machine assemblers	Machine Man	231	4	235	32
	Crane Driver	89		89	31
	Operator	56		56	35
	Mechanic	74		74	36
Elementary occupations	Helper	1274	9	1283	24
	Other	391	9	400	39

Table 2.7a: Total Number of Employment by Gender (BSCO-4 digit Occupation)

Occupations BSCO-1	Occupations BSCO-4	At Factory			At Head office			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Manager	Senior Executive	40	0	40	38	1	39	78	1	79
	Finance Executive	20	0	20	36	0	36	56	0	56
	HRM	2	1	3	7	4	11	9	5	14
	SBA	82	1	83	59	0	59	141	1	142
Professional	Engineer	73	4	77	13	4	17	86	8	94
	Naval Architect	31	7	38	5	0	5	36	7	43
	Accountant	30	0	30	36	0	36	66		66
	Stress Analyst	2	0	2	3	0	3	5	0	5
	Admin	58	0	58	3	0	3	61	0	61

Occupations BSCO-1	Occupations BSCO-4	At Factory			At Head office			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Technician and associate professional	Supervisor	71	0	71	1	0	1	72	0	72
	Technician	10	0	10	3	0	3	13	0	13
	Marine Engineer	26	1	27	16	2	18	42	3	45
	Sareng	8	0	8	0	0	0	8	0	8
	Agent	4	0	4	4	0	4	8	0	8
Clerical support staff	Computer Operator	1	0	1	6	0	6	7	0	7
	Receptionist	1	0	1	2	0	2	3	0	3
	Production	10	0	10	3	0	3	13	0	13
	Store keeper	2	0	2	0	0	0	2	0	2
Service and sales staff	Security	26	0	26	0	0	0	26	0	26
Technical workers	Send Blaster	309	0	309	0	0	0	309	0	309
	Carpenter	113	0	113	0	0	0	113	0	113
	Plumber	1042	2	1044	0	0	0	1042	2	1044
	Painter	551	93	644	5	0	5	556	93	649
	Molding Technician	4	0	4	0	0	0	4	0	4
	Welder	1457	6	1463	0	4	4	1457	10	1467
	Black smith	1	0	1	0	0	0	1	0	1
	Lathe Machine Operator	5	0	5	0	0	0	5	0	5
	Grinder	250	0	250	0	0	0	250	0	250
	Electrician	271	0	271	1	0	1	272	0	272
Factory and machine operators and machine assemblers	Operator	56	0	56	0	0	0	56	0	56
	Wing Man	1	0	1	0	0	0	1	0	1
	Fabricator	5	0	5	0	0	0	5	0	5
	Machine Man	231	4	235	0	0	0	231	4	235
	Mechanic	91	0	91	0	0	0	91	0	91
	Technical Assistant	1	0	1	0	0	0	1	0	1
	Crane Driver	89	0	89	0	0	0	89	0	89
	Docker	14	0	14	0	0	0	14	0	14
Elementary profession	Peon	1309	9	1318	7	0	7	1316	9	1325
	Turner	20	0	20	0	0	0	20	0	20

Table 67 Total Number of Employment by Gender (BSCO-3-digit Occupation)

Occupations BSCO-1	Occupations BSCO-3	At Factory			At Head office			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Manager	Managing directors and chief executives	40	0	40	38	1	39	78	1	79
	Business services and administration managers	104	2	106	102	4	106	206	6	212
Professional	Engineering professionals	73	4	77	13	4	17	86	8	94

Occupations BSCO-1	Occupations BSCO-3	At Factory			At Head office			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
	(excluding electro technology)									
	Architects, planners, surveyors and designers	31	7	38	5	0	5	36	7	43
	Finance professionals	30		30	36		36	66		66
	Administration professionals	60		60	6		6	66		66
Technician and associate professional	Mining, manufacturing and construction supervisors	71		71	1		1	72		72
	Process control technicians	10		10	3		3	13		13
	Ship and aircraft controllers and technicians	34	1	35	16	2	18	50	3	53
	Sales and purchasing agents and brokers	4		4	4		4	8		8
Clerical support staff	Keyboard operators	1		1	6		6	7		7
	Client information workers	1		1	2		2	3		3
	Material-recording and transport clerks	10		10	3		3	13		13
	Other clerical support workers	2		2	0		0	2		2
Service and sales staff	Protective services workers	26		26	0		0	26		26
Technical workers	Building frame and related trades workers	422		422	0		0	422		422
	Building finishers and related trades workers	1042	2	1044	0	0	0	1042	2	1044
	Painters, building structure cleaners and related trades workers	551	93	644	5	0	5	556	93	649
	Sheet and structural metal workers, molders and welders, and related workers	1461	6	1467	0	4	4	1461	10	1471
	Blacksmiths, toolmakers and related trades workers	256		256	0		0	256		256
	Electrical equipment installers and repairers	271		271	1		1	272		272

Occupations BSCO-1	Occupations BSCO-3	At Factory			At Head office			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Factory and machine operators and machine assemblers	Metal processing and finishing plant operators	56		56	0		0	56		56
	Textile, fur and leather products machine operators	6		6	0		0	6		6
	Other stationary plant and machine operators	231	4	235	0	0	0	231	4	235
	Assemblers	92		92	0		0	92		92
	Mobile plant operators	89		89	0		0	89		89
	Ships' deck crews and related workers	14		14	0		0	14		14
Elementary profession	office cleaners and helpers	1309	9	1318	7	0	7	1316	9	1325
	Manufacturing laborers	20		20	0		0	20		20

Table 68 Composition of Permanent, Temporary, Full Time and Part Time Employees

Occupations BSCO-1	Occupations BSCO-4	Total Employment	Percentage of permanent workers	Percentage of temporary workers	Percentage of workers with full time	Percentage of workers with part time
Manager	Senior Executive	79	98.44	0.00	98.44	0.00
	Finance Executive	56	93.75	6.25	100.00	0.00
	HRM	14	100.00	0.00	100.00	0.00
	SBA	142	97.17	2.83	100.00	0.00
Professional	Engineer	94	97.65	1.52	97.65	1.52
	Naval Architect	43	100.00	0.00	100.00	0.00
	Accountant	66	96.09	3.91	100.00	0.00
	Stress Analyst	5	100.00	0.00	100.00	0.00
	Admin	61	100.00	0.00	100.00	0.00
Technician and associate professional	Supervisor	72	94.32	5.68	95.45	4.55
	Technician	13	100.00	0.00	100.00	0.00
	Marine Engineer	45	98.96	0.00	98.96	0.00
	Sareng	8	90.00	10.00	100.00	0.00
	Agent	8	100.00	0.00	100.00	0.00
Clerical support staff	Computer Operator	7	100.00	0.00	100.00	0.00
	Receptionist	3	100.00	0.00	100.00	0.00
	Production	13	100.00	0.00	100.00	0.00
	Store keeper	2	100.00	0.00	100.00	0.00
Service and sales staff	Security	26	96.43	3.57	100.00	0.00
Technical workers	Send Blaster	309	84.53	15.47	88.74	11.26

Occupations BSCO-1	Occupations BSCO-4	Total Employment	Percentage of permanent workers	Percentage of temporary workers	Percentage of workers with full time	Percentage of workers with part time
	Carpenter	113	90.28	9.72	100.00	0.00
	Plumber	1044	83.10	16.90	92.58	7.42
	Painter	649	78.09	21.91	89.61	10.39
	Molding Technician	4	100.00	0.00	100.00	0.00
	Welder	1467	82.57	17.43	91.64	8.36
	Black smith	1	100.00	0.00	100.00	0.00
	Lathe Machine Operator	5	100.00	0.00	100.00	0.00
	Grinder	250	90.25	9.75	97.47	2.53
	Electrician	272	95.54	4.46	100.00	0.00
Factory and machine operators and machine assemblers	Operator	56	91.11	8.89	91.11	8.89
	Wing Man	1	100.00	0.00	100.00	0.00
	Fabricator	5	100.00	0.00	100.00	0.00
	Machine Man	235	93.21	6.79	93.21	6.79
	Mechanic	91	96.25	3.75	100.00	0.00
	Technical Assistant	1	100.00	0.00	100.00	0.00
	Crane Driver	89	100.00	0.00	100.00	0.00
	Docker	14	100.00	0.00	100.00	0.00
Elementary profession	Peon	1325	73.95	26.05	86.00	14.00
	Turner	20	83.33	16.67	83.33	16.67

Table 69 Comparative Changes in Employment during 2018 and 2019 by Occupation

BSCO Code 1-digit Occupation Title	Occupation Name BSCO Code 4-digit	Hired in 2018	Hired in 2019	Fired in 2018	Fired in 2019	Net inclusion in employment in 2018	Net inclusion in employment in 2019	Differences in changes in Net inclusion in employment in 2018-19
Manager	Management/Manager	10	11	3	6	7	5	-2
	Finance Executive	5	10	2	3	3	7	4
Professional	Accountant	10	4	2	2	8	2	-6
	Admin	6	10	3	3	3	7	4
	Engineer	5	13	5	2	0	11	11
	Naval Architect/Architect	9	9	1	1	8	8	0
Technician and associate professional	Foreman	4	2	3	2	1	0	-1
Technical workers	Welder	352	390	236	281	116	109	-7
	Painter	266	272	188	226	78	46	-32
	Electrician	88	84	63	67	25	17	-8

BSCO Code 1-digit Occupation Title	Occupation Name BSCO Code 4-digit	Hired in 2018	Hired in 2019	Fired in 2018	Fired in 2019	Net inclusion in employm ent in 2018	Net inclusion in employme nt in 2019	Differences in changes in Net inclusion in employme nt in 2018- 19
	Fitter	302	325	229	237	73	88	15
	Cutter man	119	115	101	106	18	9	-9
	Grinder	121	130	98	102	23	28	5
	Carpenter	66	67	55	53	11	14	3
	Gas Cutter	6	8	4	4	2	4	2
Factory and machine operators and machine assemblers	Machine Man	71	67	47	67	24	0	-24
	Crane Driver	8	9	4	3	4	6	2
	Operator	8	8	4	5	4	3	-1
	Mechanic	12	14	8	12	4	2	-2
Primary profession	Helper	302	316	220	275	82	41	-41
	Other	113	126	90	93	23	33	10

Annex (Section 2.4)

Table 70 Employment in the Shipbuilding Industry during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations

Occupations BSCO-1	Occupations BSCO-4	1st Quarter			2nd Quarter			3rd Quarter		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Manager	Senior Executive	92	1	93	82	1	83	92	1	93
	Finance Executive	56	0	56	53	0	53	56	0	56
	HRM	8	0	8	8	0	8	8	0	8
	SBA	148	1	149	114	0	114	135	1	136
Professional	Engineer	80	0	80	70	0	70	79	0	79
	Naval Architect/	20	7	27	20	7	27	20	7	27
	Accountant	66	0	66	63	0	63	66	0	66
	Admin	61	2	63	3	0	3	43	2	45
Technician and associate professional	Supervisor	70	0	70	54	0	54	73	0	73
	Technician	11	0	11	11	0	11	11	0	11
	Marine Engineer	44	0	44	45	0	45	45	0	45
	Sareng	8	0	8	6	0	6	8	0	8
	Agent	8	0	8	4	0	4	8	0	8
Clerical support staff	Computer Operator	9	0	9	9	0	9	9	0	9
	Receptionist	3	0	3	3	0	3	3	0	3
	Production	13	0	13	13	0	13	13	0	13
	Store keeper	2	0	2	1	0	1	2	0	2
Service and sales staff	Security	26	0	26	14	0	14	25	0	25
Technical workers	Send Blaster	321	0	321	164	0	164	307	0	307
	Carpenter	94	0	94	37	0	37	89	0	89
	Plumber	1052	0	1052	793	0	793	947	0	947
	Painter	570	93	663	424	27	451	532	84	616
	Welder	1426	0	1426	1140	0	1140	1347	0	1347
	Lathe Machine Operator	3	0	3	0	0	0	3	0	3
	Grinder	259	0	259	217	0	217	266	0	266
	Electrician	265	0	265	249	0	249	254	0	254
Factory and machine operators and machine Assemblers	Operator	51	0	51	46	0	46	51	0	51
	Wing Man	1	0	1	1	0	1	1	0	1
	Fabricator	5	0	5	5	0	5	5	0	5
	Machine Man	218	4	222	192	4	196	217	4	221
	Mechanic	89	0	89	84	0	84	62	0	62
	Technical Assist	1	0	1	0	0	0	1	0	1
	Crane Driver	74	0	74	74	0	74	74	0	74
Primary profession	Peon	1136	9	1145	867	2	869	1047	9	1056
	Turner	3	0	3	0	0	0	3	0	3

Table 71 Job Growth (+)/ loss (-) in the Shipbuilding Industry during the first three quarters of Covid-19 by BSCO Code 1-digit level occupations (%)

Occupations BSCO-1	Occupations BSCO-4	Job Growth (+)/ loss (-) in quarter 2 relative to quarter 1	Job Growth (+)/ loss (-) in quarter 3 relative to quarter 1	Job Growth (+)/ loss (-) in quarter 3 relative to quarter 2
Manager	Senior Executive	-12.05	0.00	10.75
	Finance Executive	-5.66	0.00	5.36
	HRM	0.00	0.00	0.00
	SBA	-30.70	-9.56	16.18
Professional	Engineer	-14.29	-1.27	11.39
	Naval Architect/	0.00	0.00	0.00
	Accountant	-4.76	0.00	4.55
	Admin	-2000.00	-40.00	93.33
Technician and associate professional	Supervisor	-29.63	4.11	26.03
	Technician	0.00	0.00	0.00
	Marine Engineer	2.22	2.22	0.00
	Sareng	-33.33	0.00	25.00
	Agent	-100.00	0.00	50.00
Clerical support staff	Computer Operator	0.00	0.00	0.00
	Receptionist	0.00	0.00	0.00
	Production	0.00	0.00	0.00
	Store keeper	-100.00	0.00	50.00
Service and sales staff	Security	-85.71	-4.00	44.00
Technical workers	Send Blaster	-95.73	-4.56	46.58
	Carpenter	-154.05	-5.62	58.43
	Plumber	-32.66	-11.09	16.26
	Painter	-47.01	-7.63	26.79
	Welder	-25.09	-5.86	15.37
	Lathe Machine Operator	0.00	0.00	0
	Grinder	-19.35	2.63	18.42
	Electrician	-6.43	-4.33	1.97
Factory and machine operators and machine Assemblers	Operator	-10.87	0.00	9.80
	Wing Man	0.00	0.00	0.00
	Fabricator	0.00	0.00	0.00
	Machine Man	-13.27	-0.45	11.31
	Mechanic	-5.95	-43.55	-35.48
	Technical Assistant	0.00	0.00	0
	Crane Driver	0.00	0.00	0.00
Primary profession	Peon	-31.76	-8.43	17.71
	Turner	0.00	0.00	0

Annex (Section 2.6)

Table 72 Extent of Formality- contract type with respect to BSCO 1-digit level occupation (%)

OccupationsB SCO-1	Occupations BSCO-4	Permanent		Temporary		
		Written Contract (%)	Oral Contract (%)	Written Contract (%)	Oral Contract (%)	
Manager	Senior Executive	65.52	31.03	3.45	0.00	
	Finance Executive	64.29	28.57	0.00	0.00	
	HRM	77.78	0.00	0.00	0.00	
	SBA	69.09	28.18	3.64	2.73	
Professional	Engineer	111.33	4.00	4.00	0.40	
	Naval Architect/	0.00	0.00	0.00	0.00	
	Accountant	100.87	30.43	4.35	4.35	
	Admin	100.00	0.00	0.00	0.00	
Technician and associate professional	Supervisor	60.42	33.33	4.17	2.08	
	Technician	100.00	0.00	0.00	0.00	
	Marine Engineer	83.33	16.67	0.00	0.00	
	Sareng	0.00	100.00	0.00	0.00	
Clerical support staff	Agent	100.00	0.00	0.00	0.00	
	Computer Operator	75.00	25.00	0.00	0.00	
	Receptionist	75.00	0.00	0.00	0.00	
	Production	100.00	0.00	0.00	0.00	
Service and sales staff	Store keeper	50.00	50.00	0.00	0.00	
	Security	0.00	100.00	0.00	0.00	
	Technical workers	Send Blaster	30.00	22.81	6.10	45.29
		Carpenter	25.00	0.00	0.00	75.00
Plumber		36.30	26.18	9.02	32.58	
Painter		34.17	26.34	7.95	35.10	
Welder		35.87	26.60	7.77	33.18	
Lathe Machine Operator		0.00	100.00	0.00	0.00	
Grinder		20.00	47.00	10.00	41.33	
Electrician		43.24	30.18	4.05	23.42	
Factory and machine operators and machine Assemblers	Operator	69.33	0.00	6.67	24.00	
	Wing Man	0.00	0.00	0.00	0.00	
	Fabricator	0.00	0.00	0.00	0.00	
	Machine Man	65.80	20.67	13.87	10.67	
	Mechanic	42.86	28.57	0.00	28.57	
	Technical Assistant	100.00	0.00	100.00	0.00	
	Crane Driver	100.00	0.00	0.00	0.00	
Primary profession	Peon	35.95	26.74	4.79	40.33	
	Turner	100.00	0.00	0.00	0.00	

Table 73 Extent of Formality-Percentage of Unpaid Vacation with respect to BSCO 1-digit level occupation (%)

Occupations BSCO-1	Occupations BSCO-4	Weekly (%)	Sickness (%)	Causal (%)	Maternity/Pa ternity (%)
Manager	Senior Executive	3.45	20.69	6.9	17.24
	Finance Executive	14.29	28.57	0	14.29
	HRM	0	0	0	0
	SBA	3.64	10.91	10.91	10.91
Professional	Engineer	4	16	16	20
	Naval Architect/	0	0	0	0
	Accountant	4.35	17.39	4.35	4.35
	Admin	66.67	66.67	66.67	33.33
Technician and associate professional	Supervisor	0	8.33	8.33	4.17
	Technician	0	0	0	0
	Marine Engineer	33.33	33.33	0	0
	Sareng	0	0	40	0
	Agent	0	0	0	0
Clerical support staff	Computer Operator	0	50	0	0
	Receptionist	0	0	0	0
	Production	0	0	0	0
	Store keeper	50	50	50	50
Service and sales staff	Security	0	0	20	20
Technical workers	Send Blaster	44	56	52	32
	Carpenter	100	100	100	75
	Plumber	27.59	41.38	37.93	25.86
	Painter	30.77	48.08	42.31	28.85
	Welder	26.23	44.26	36.07	24.59
	Lathe Machine Operator	0	0	0	0
	Grinder	10	60	40	40
	Electrician	10.81	32.43	24.32	18.92
Factory and machine operators and machine Assemblers	Operator	0	20	20	20
	Wing Man	0	0	0	0
	Fabricator	0	0	0	0
	Machine Man	4	24	28	20
	Mechanic	28.57	42.86	28.57	14.29
	Technical Assistant	0	0	100	100
	Crane Driver	0	0	0	0
Primary profession	Peon	29.17	43.75	47.92	31.25
	Turner	0	0	0	0

Table 74 Extent of Formality – Overtime and Termination Notification with respect to BSCO 1-digit level occupations(%)

Occupations BSCO-1	Occupations BSCO-4	Whether employees work overtime (%)	Percentage of the total workers doing the overtime (%)	Percentage of the total workers get paid for the overtime (%)	In case of leaving the jobs, employees notify the employers in advance (%)	In case of firing the employees, enterprise notify the employees in advance (%)
Manager	Senior Executive	3.13	100.00	0	99.82	100.00
	Finance Executive	22.22	55.00	50.00	98.22	100.00
	HRM	0	0.00	76.33	100.00	100.00
	SBA	28.3	75.31	0	97.58	97.80
Professional	Engineer	52	61.92	72.69	95.59	99.50
	Naval Architect/	66.67	12.50	12.50	100.00	100.00
	Accountant	13.04	96.67	95.00	99.00	100.00
	Admin	0	0.00	0.00	0.00	0.00
Technician and associate professional	Supervisor	84	94.19	90.58	89.50	99.17
	Technician	100	62.50	65.00	85.00	100.00
	Marine Engineer	12.5	95.00	95.00	98.13	100.00
	Sareng	80	100.00	100.00	100.00	100.00
	Agent	0	0.00	0.00	0.00	0.00
Clerical support staff	Computer Operator	25	90.00	90.00	100.00	100.00
	Receptionist	0	0.00	0.00	100.00	100.00
	Production	100	40.00	40.00	90.00	100.00
	Store keeper	50	100.00	100.00	99.00	100.00
Service and sales staff	Security	42.86	91.67	75.00	84.00	100.00
Technical workers	Send Blaster	86.67	81.85	81.58	91.73	88.46
	Carpenter	83.33	85.00	85.00	70.00	80.00
	Plumber	90	83.09	83.96	84.23	92.46
	Painter	94.55	81.15	82.39	85.08	93.08
	Welder	92.42	81.35	83.41	86.10	93.55
	Lathe Machine Operator	100	97.50	100.00	95.00	85.00
	Grinder	87.5	72.21	70.93	79.38	88.13
	Electrician	71.79	77.50	80.54	85.91	94.68
Factory and machine operators and machine Assemblers	Operator	80	73.00	75.00	95.00	90.00
	Wing Man	0	0.00	0.00	80.00	70.00
	Fabricator	100	100.00	100.00	100.00	100.00
	Machine Man	88.89	76.54	78.38	91.70	95.93
	Mechanic	77.78	93.57	93.57	71.67	93.33
	Technical Assistant	100	100.00	100.00	100.00	100.00
	Crane Driver	66.67	62.50	69.00	88.00	100.00
Primary profession	Peon	85.19	85.98	84.13	84.28	93.00
	Turner	100	95.00	100.00	90.00	100.00

Annex (Section 2.7)

Table 75 Desired Occupation by Qualification Matrix-Level of Education (%)

OccupationsB SCO-1	Occupations BSCO-4	Illiter ate	Clas s 1 to 5	Class 6 to 10	SSC equi valent	HSC equi valent	Dipl oma	Voc atio n	Bache lor	Mast ers
Manager	Senior Executive	0	0	0	3.03	15.15	0	0	33.33	48.48
	Finance Executive	0	0	0	0	0	0	0	87.5	12.5
	HRM	0	0	0	0	0	0	0	0	100
	SBA	0	0	0	3.64	7.27	0	1.82	52.73	34.55
Professional	Engineer	0	0	0	4	0	52	4	16	24
	Naval Architect/	0	0	0	50	0	50	0	0	0
	Accountant	0	0	0	0	4.35	0	0	60.87	34.78
	Admin	0	0	0	0	0	0	0	100	0
Technician and associate professional	Supervisor	0	0	28.57	38.1	33.33	0	0	0	0
	Technician	0	0	0	0	0	50	0	0	50
	Marine Engineer	0	0	0	0	0	42.86	0	57.14	0
	Sareng	40	0	60	0	0	0	0	0	0
	Agent	0	0	0	0	0	0	0	0	100
Clerical support staff	Computer Operator	0	0	0	0	25	25	0	50	0
	Receptionist	0	0	0	0	0	0	0	100	0
	Production	0	0	0	0	0	0	0	0	100
	Store keeper	0	0	0	0	50	0	0	50	0
Service and sales staff	Security	14.29	14.29	57.14	14.29	0	0	0	0	0
Technical workers	Send Blaster	21.43	14.29	53.57	10.71	0	0	0	0	0
	Carpenter	20	0	60	20	0	0	0	0	0
	Plumber	9.26	9.26	51.85	29.63	0	0	0	0	0
	Painter	10	14	60	12	2	0	2	0	0
	Welder	8.62	5.17	68.97	15.52	0	0	1.72	0	0
	Lathe Machine Operator	0	0	100	0	0	0	0	0	0
	Grinder	0	8.33	83.33	8.33	0	0	0	0	0
	Electrician	5.88	0	44.12	41.18	2.94	0	2.94	2.94	0
Factory and machine operators and machine Assemblers	Operator	0	25	25	50	0	0	0	0	0
	Wing Man	0	0	100	0	0	0	0	0	0
	Fabricator	0	0	0	0	0	0	0	0	0
	Machine Man	4.35	17.39	39.13	21.74	0	8.7	8.7	0	0
	Mechanic	0	0	50	37.5	12.5	0	0	0	0
	Technical Assistant	0	0	0	0	0	100	0	0	0

OccupationsB SCO-1	Occupations BSCO-4	Illiterate	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocational	Bachelor	Masters
	Crane Driver	0	0	20	80	0	0	0	0	0
Primary profession	Peon	13.73	23.53	45.1	9.8	1.96	1.96	0	3.92	0
	Turner	0	0	100	0	0	0	0	0	0

Table 2.26: Occupation by Qualification Matrix -Average qualification level currently held by workforce -Level of Education (%)

Table 76 Occupation by Qualification Matrix -Average qualification level currently held by workforce -Level of Education (%)

Occupations BSCO-1	Occupations BSCO-4	Illiterate	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocational	Bachelor	Masters
Manager	Senior Executive	0	6.06	0	3.03	0	0	0	36.36	54.55
	Finance Executive	0	0	0	0	25	0	0	12.5	62.5
	HRM	0	0	0	0	0	0	0	0	100
	SBA	0	1.82	1.82	5.45	21.82	1.82	5.45	27.27	34.55
Professional	Engineer	0	0	8	0	0	48	8	20	16
	Naval Architect/ Accountant	0	0	0	50	0	50	0	0	0
	Accountant	0	0	0	4.35	17.39	0	0	39.13	39.13
	Admin	0	0	0	0	0	0	0	33.33	66.67
Technician and associate professional	Supervisor	0	14.29	28.57	38.1	14.29	0	0	4.76	0
	Technician	0	0	0	50	0	0	0	0	50
	Marine Engineer	0	0	0	0	0	28.57	0	57.14	14.29
	Sareng	0	0	60	40	0	0	0	0	0
	Agent	0	0	0	0	0	0	0	0	100
Clerical support staff	Computer Operator	0	0	0	0	50	0	0	50	0
	Receptionist	0	0	0	0	0	0	0	100	0
	Production	0	0	0	0	0	0	0	0	100
	Store keeper	0	0	0	0	50	0	0	50	0
Service and sales staff	Security	0	28.57	57.14	14.29	0	0	0	0	0
Technical workers	Send Blaster	3.57	25	64.29	7.14	0	0	0	0	0
	Carpenter	0	20	60	20	0	0	0	0	0
	Plumber	0	21.43	66.07	12.5	0	0	0	0	0

Occupations BSCO-1	Occupations BSCO-4	Illite rate	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Voc ation	Bachelor	Master s
	Painter	1.92	26.92	59.62	9.62	0	0	1.92	0	0
	Welder	0	18.97	56.9	22.41	0	0	1.72	0	0
	Lathe Machine Operator	0	50	50	0	0	0	0	0	0
	Grinder	8.33	16.67	75	0	0	0	0	0	0
	Electrician	0	11.76	61.76	17.65	2.94	0	2.94	2.94	0
Factory and machine operators and machine Assemblers	Operator	0	25	50	25	0	0	0	0	0
	Wing Man	0	0	100	0	0	0	0	0	0
	Fabricator	0	0	0	0	0	0	0	0	0
	Machine Man	0	21.74	56.52	13.04	0	0	8.7	0	0
	Mechanic	0	12.5	50	37.5	0	0	0	0	0
	Technical Assistant	0	0	0	0	0	100	0	0	0
Primary profession	Crane Driver	0	0	40	60	0	0	0	0	0
	Peon	1.96	39.22	45.1	3.92	5.88	0	0	1.96	1.96
	Turner	0	100	0	0	0	0	0	0	0

Table 2.27: Desired versus Currently held Occupation by Qualification Matrix-Field of Education (%)

Table 77 Desired versus Currently held Occupation by Qualification Matrix-Field of Education (%)

Occupations BSCO-1	Occupations BSCO-4	Desired Qualifications				Average qualification level currently held by workforce		
		Science	Arts	Commerce	Do not Know	Science	Arts	Commerce
Manager	Senior Executive	27.27	3.03	30.3	39.39	38.1	14.29	47.62
	Finance Executive	12.5	0	50	37.5	33.33	0	66.67
	HRM	0	0	100	0	0	0	100
	SBA	25.45	12.73	27.27	34.55	24.14	41.38	34.48
Professional	Engineer	100	0	0	0	92.86	7.14	0
	Naval Architect/	100	0	0	0	100	0	0
	Accountant	8.7	0	78.26	13.04	0	0	100
	Admin	33.33	0	33.33	33.33	0	50	50
Technician and associate professional	Supervisor	15.38	23.08	0	61.54	33.33	66.67	0
	Technician	100	0	0	0	50	0	50
	Marine Engineer	100	0	0	0	60	20	20
	Sareng	0	0	0	100	0	0	0
	Agent	100	0	0	0	100	0	0

Occupations BSCO-1	Occupations BSCO-4	Desired Qualifications				Average qualification level currently held by workforce		
		Science	Arts	Commerce	Do not Know	Science	Arts	Commerce
Clerical support staff	Computer Operator	50	25	25	0	50	0	50
	Receptionist	0	100	0	0	50	50	0
	Production	0	0	100	0	0	0	100
	Store keeper	0	0	50	50	0	100	0
Service and sales staff	Security	0	0	0	100	50	50	0
Technical workers	Send Blaster	3.33	6.67	0	90	16.67	83.33	0
	Carpenter	16.67	16.67	0	66.67	0	100	0
	Plumber	1.64	9.84	1.64	86.89	5.26	84.21	10.53
	Painter	3.57	10.71	0	85.71	12.5	87.5	0
	Welder	4.76	6.35	0	88.89	14.29	80.95	4.76
	Lathe Machine Operator	0	0	0	100	0	0	0
	Grinder	7.14	14.29	0	78.57	50	50	0
	Electrician	37.5	7.5	0	55	52.63	42.11	5.26
Factory and machine operators and machine Assemblers	Operator	20	20	0	60	50	50	0
	Wing Man	100	0	0	0	0	0	0
	Fabricator	0	0	0	100	0	100	0
	Machine Man	30.77	0	0	69.23	58.33	33.33	8.33
	Mechanic	11.11	11.11	0	77.78	20	80	0
	Technical Assistant	100	0	0	0	100	0	0
	Crane Driver	50	16.67	0	33.33	33.33	66.67	0
Primary profession	Peon	3.77	7.55	3.77	84.91	15.38	69.23	15.38
	Turner	0	0	0	100	0	0	0

Table 78 Difference in the Experiences at the Entry Level

Occupations BSCO-1	Occupations BSCO-4	Experience at the entry level (in Years)	
		Desired	Desired
Manager	Senior Executive	4.79	4.85
	Finance Executive	2.75	4.00
	HRM	1.67	2.67
	SBA	3.93	4.42
Professional	Engineer	3.56	2.76
	Naval Architect/	5.75	5.50
	Accountant	3.00	3.52
	Admin	1.67	1.67
Technician and associate professional	Supervisor	3.54	3.77
	Technician	2.00	2.00
	Marine Engineer	3.14	2.86
	Sareng	1.80	6.40
	Agent	2.00	3.00
Clerical support staff	Computer Operator	3.50	2.75
	Receptionist	1.00	1.00
	Production	3.00	3.00

Occupations BSCO-1	Occupations BSCO-4	Experience at the entry level (in Years)	
		Desired	Desired
	Store keeper	4.00	4.00
Service and sales staff	Security	1.00	1.43
Technical workers	Send Blaster	2.67	3.07
	Carpenter	2.83	3.00
	Plumber	3.23	3.23
	Painter	3.04	3.07
	Welder	3.19	3.24
	Lathe Machine Operator	4.50	3.00
	Grinder	2.47	2.93
	Electrician	3.58	3.95
Factory and machine operators and machine Assemblers	Operator	4.80	4.20
	Wing Man	3.00	3.00
	Fabricator	2.00	5.00
	Machine Man	2.95	3.15
	Mechanic	3.33	3.67
	Technical Assistant	3.00	3.00
	Crane Driver	3.67	4.00
Primary profession	Peon	1.81	1.92
	Turner	3.00	2.00

Annex (SECTION: 2.8)

Table 79 Gender Preferences across BSCO Code 4-digit level Occupations (%)

BSCO Code 1-digit Occupation Title	Occupation Name BSCO-4	Male	Female	No Gender Preference
Manager	Finance Executive	62.5	0	37.5
	Management/Manager	81.48	0	18.52
Professional	Accountant	52.17	0	47.83
	Admin	50	0	50
	Engineer	95.83	0	4.17
	Naval Architect/Architect	100	0	0
Technician and associate professional	Foreman	93.33	0	6.67
Technical workers	Carpenter	40	20	40
	Cutter man	89.66	0	10.34
	Electrician	84.62	0	15.38
	Fitter	87.72	0	12.28
	Gas Cutter	75	0	25
	Grinder	100	0	0
	Painter	74.51	11.76	13.73
	Welder	87.93	0	12.07
Factory and machine operators and machine assemblers	Crane Driver	100	0	0
	Machine Man	96.15	0	3.85
	Mechanic	28.57	0	71.43
	Operator	80	0	20
Primary profession	Helper	93.18	0	6.82
	Other	76.6	1.06	22.34
Total		82.42	1.42	16.16

Table 80 Extent of Physical Labour across BSCO Code 4-digit level Occupations (%)

BSCO Code 1-digit Occupation Title	Occupation Name BSCO-4	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager	Finance Executive	12.5	87.5	0	4.50
	Management/Manager	35.19	61.11	3.7	3.81
Professional	Accountant	39.13	60.87	0	3.74
	Admin	50	50	0	4.00
	Engineer	25	70.83	4.17	4.33
	Naval Architect/Architect	0	50	50	6.00
Technician and associate professional	Foreman	6.67	80	13.33	4.93
Technical workers	Carpenter	0	0	100	7.80
	Cutter man	0	3.45	96.55	7.76
	Electrician	2.56	38.46	58.97	6.64
	Fitter	0	10.53	89.47	7.86
	Gas Cutter	0	75	25	6.25
	Grinder	0	0	100	7.64
	Painter	0	9.8	90.2	7.49
	Welder	0	10.34	89.66	7.81

BSCO Code 1-digit Occupation Title	Occupation Name BSCO-4	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Factory and machine operators and machine assemblers	Crane Driver	0	50	50	6.50
	Machine Man	0	15.38	84.62	7.35
	Mechanic	0	28.57	71.43	7.29
	Operator	0	40	60	7.40
Primary profession	Helper	0	6.82	93.18	8.07
	Other	32.98	44.68	22.34	4.72
Total		12.26	31.08	56.66	6.31

Table 81 Extent of Difficulties in filing up the vacancies across BSCO Code 4-digit level Occupations

BSCO Code 1-digit Occupation Title	Occupation Name BSCO-4	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	No. of Unfilled vacancies currently	Total Employment level at present	Unfilled vacancies as % of total current employment
Manager	Finance Executive	25.00	50	25	4.63	6	141	4.26
	Management/Manager	22.22	27.78	50	5.52	43	56	76.79
Professional	Accountant	21.74	47.83	30.43	4.78	19	66	28.79
	Admin	50.00	50	0	4.00	1	61	1.64
	Engineer	16.67	20.83	62.5	6.13	33	91	36.26
	Naval Architect/Architect	0.00	50	50	6.50	9	43	20.93
Technician and associate professional	Foreman	13.33	20	66.67	6.47	17	51	33.33
Technical workers	Carpenter	40.00	20	40	4.60	15	1412	1.06
	Cutter man	27.59	27.59	44.83	5.14	110	649	16.95
	Electrician	12.82	51.28	35.9	5.59	121	272	44.49
	Fitter	21.05	31.58	47.37	5.67	234	1016	23.03
	Gas Cutter	25.00	75	0	4.25	19	295	6.44
	Grinder	28.57	64.29	7.14	4.36	55	250	22.00
	Painter	23.53	35.29	41.18	5.47	163	113	144.25
	Welder	13.79	43.1	43.1	5.72	245	55	445.45
Factory and machine operators and machine assemblers	Crane Driver	50.00	50	0	4.00	0	235	0.00
	Machine Man	3.85	30.77	65.38	6.54	65	89	73.03
	Mechanic	14.29	71.43	14.29	5.29	14	56	25.00
	Operator	20.00	40	40	5.60	33	74	44.59
Primary profession	Helper	36.36	31.82	31.82	4.84	223	1283	17.38
	Other	37.23	35.11	27.66	4.39	73	400	18.25
Total		23.62	36.41	39.96	5.29	1498	6708	22.23

Table 82 Time taken to fill up the vacant positions across BSCO Code 4-digit level Occupations (%)

BSCO Code 1-digit Occupation Title	Occupation Name BSCO-4	Immediately	Less than a week	More than a week but less than a month	More than a month
Manager	Finance Executive	0	12.5	25	62.5
	Management/Manager	5.56	11.11	35.19	48.15
Professional	Accountant	13.04	0	30.43	56.52
	Admin	0	50	0	50
	Engineer	0	12.5	45.83	41.67
	Naval Architect/Architect	0	0	0	100
Technician and associate professional	Foreman	20	40	20	20
Technical workers	Carpenter	20	20	40	20
	Cutter man	41.38	17.24	17.24	24.14
	Electrician	28.21	7.69	41.03	23.08
	Fitter	31.58	17.54	29.82	21.05
	Gas Cutter	0	25	25	50
	Grinder	42.86	7.14	7.14	42.86
	Painter	29.41	23.53	21.57	25.49
	Welder	27.59	24.14	24.14	24.14
Factory and machine operators and machine assemblers	Crane Driver	0	0	0	100
	Machine Man	19.23	15.38	30.77	34.62
	Mechanic	14.29	14.29	71.43	0
	Operator	60	0	40	0
Primary profession	Helper	47.73	18.18	13.64	20.45
	Other	19.15	10.64	7.45	62.77
Total		24.16	15.45	24.33	36.06

Annex (Section 2.10)

Table 83 Gender Preferences across BSCO Code 4-digit level Occupations needed for further expanding

Occupations BSCO-1	Occupations (BSCO code 4-digit level)	Male	Female	No Preference
Manager	E-commerce Operator	100		
	Management Information System Officer	66.67		33.33
Professional	Accountant	100		
	Engineer	100		
	Stress Analyst	100		
	Naval Architect/Architect	88.89		11.11
	Advisor	40		60
	Consultant	33.33		66.67
Technician and associate professional	Agent	100		
	Foreman	100		
	Production In Charge	100		
Clerical support staff	Computer Operator	83.33		16.67
	Store Keeper	100		
Technical workers	Cutter man	100		
	Painter	66.67		33.33
	Electrician	100		
	Fitter	100		
	Salvage Operator	100		
	Molding Technician	80	20	
	C & C Operator	100		
	3D Printing Technician	50		50
Factory and machine operators and machine assemblers	Driver	100		
	Grizer	100		
	Machine Man	100		
	Purchase Officer	100		
Primary profession	Power engine man	50		50
	Other	79.31		20.69
Total		85.38	0.77	13.85

Table 84 Occupation (BSCO code 4-digit level) required for future expansion or cutting costs by Qualification Matrix - Minimum qualification level expected from the future workforce -Level of Education (%)

Occupations BSCO-1	Occupations (BSCO code 4-digit level)	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocational	Bachelor	Masters
Manager	Management Information System Officer								100
	E-commerce Operator							100	
Professional	Accountant							16.67	83.33
	Engineer							57.14	42.86
	Stress Analyst					100			
	Naval Architect/Archi					11.11	0	55.56	33.33

Occupations BSCO-1	Occupations (BSCO code 4-digit level)	Class 1 to 5	Class 6 to 10	SSC equivalent	HSC equivalent	Diploma	Vocational	Bachelor	Masters
	Advisor					0	20	20	60
	Consultant								100
Technician and associate professional	Agent								100
	Foreman		50	50					
	Production In Charge							50	50
Clerical support staff	Computer Operator				16.67	33.33		50	
	Store keeper			50	50				
Technical workers	Painter					33.33		66.67	
	Electrician		42.86	28.57		14.29		14.29	
	Fitter		50					50	
	Salvage Operator					50		50	
	Cutter man		50	25		0		25	
	Molding Technician	20				60	20		
	C & C Operator					75	25		
	3D Printing Technicia					50	0	50	
Factory and machine operators and machine assemblers	Machine Man		25			50	0	25	
	Driver	50			50				
	Purchase Officer				100				
	Grizer			25	25	50			
Primary profession	Power engine man							50	50
	Other		13.79	13.79	13.79	3.45	3.45	37.93	13.79
Total		1.54	9.23	7.69	7.69	17.69	3.08	30.77	22.31

Table 85 Desired Educational Background and Experience level for the future workforce (Occupation at BSCO code 4-digit level) required for the future expansion (%)

Occupations (BSCO code 1-digit level)	Occupations (BSCO code 4-digit level)	Desired Minimum Qualifications				Desired Minimum Average Years of Experiences at the entry level
		Science	Arts	Commerce	Do not Know	
Manager	E-commerce	33.33		33.33	33.33	5.7
	Management Information System Officer	33.33		66.67		3.3
Professional	Accountant	16.67		83.33		4.8
	Advisor	80		20		3.8
	Consultant	66.67		33.33		6.7
	Engineer	100				4.7
	Naval Architect/Architect	88.89	11.11			4.8
	Stress Analyst	100				2.5
	Agent	100				3.0

Occupations (BSCO code 1-digit level)	Occupations (BSCO code 4-digit level)	Desired Minimum Qualifications				Desired Minimum Average Years of Experiences at the entry level
		Science	Arts	Commerce	Do not Know	
Technician and associate professional	Foreman				100	6.0
	Production In Charge	100				7.0
Clerical support staff	Computer Operator	16.67	66.67	16.67		3.0
	Store keeper	50	50		50	2.0
Technical workers	3D Printing Technician	50			50	2.5
	C & C Operator	100				2.3
	Cutter man	0	25		75	3.8
	Electrician	42.86			57.14	4.4
	Fitter	50			50	3.0
	Molding Technician	100				3.0
	Painter	66.67			33.33	4.3
	Salvage Operator	50			50	2.3
Factory and machine operators and machine assemblers	Driver				100	3.5
	Grizer	75			25	4.5
	Machine Man	25			75	4.3
	Purchase Officer	100				3.0
Primary profession	Power engine man	25	75			5.3
	Other	44.83	6.9		48.28	4.6
Total		54.62	9.23	9.23	26.92	4.2

Table 86 Extent of Difficulties in filing up the vacancies from Bangladesh and International Market across BSCO Code 4-digit level Occupations (%)

Occupations (BSCO code 1-digit level)	Occupations (BSCO code 4-digit level)	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager	E-commerce			100	7		100		6
	Management Information System officer		100		5		100		5
Professional	Accountant		100		5	16.67	83.33		5
	Advisor		100		6		80	20	6
	Consultant		100		6		100	0	5
	Engineer		57.14	42.86	6		85.71	14.29	5
	Naval Architect/Architect	11.11	66.67	22.22	5		77.78	22.22	6
Technician and	Stress Analyst		0	100	8	75	25		3
	Agent		100		4		100		6
	Foreman		50	50	6		50	50	6

Occupations (BSCO code 1-digit level)	Occupations (BSCO code 4-digit level)	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
associate professional	Production In Charge		100		5	50		50	5
Clerical support staff	Computer Operator	33.33	66.67		4		100		5
	Store keeper	100			3		100		5
Technical workers	3D Printing Technician			100	8	100			3
	C & C Operator			100	8	50	50		4
	Cutter man		50	50	6		50	50	7
	Electrician		28.57	71.43	7		28.57	71.43	8
	Fitter		50	50	6		50	50	8
	Molding Technician			100	8	40	60		4
	Painter		33.33	66.67	7		66.67	33.33	7
	Salvage Operator		50	50	6		100	0	5
Factory and machine operators and machine assemblers	Driver		100		5		50	50	6
	Grizer		100		6		100		6
	Machine Man		50	50	6		25	75	7
	Purchase Officer		100		4	50	50		4
Primary profession	Power engine man	25	75		4		75	25	5
	Other	6.9	37.93	55.17	7	6.9	75.86	17.24	6
	Total	6.15	52.31	41.54	6	10.77	70	19.23	6

Annex (SECTION 2.16)

Table 87 Extent of automation technology that will take place in next 5-10 years to the occupations (%)

BSCO 1-digit Occupations	Occupation Name BSCO-4	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager	HRM		100		5
	Management/Manager		100		4
Professional	Accountant		100		5.2
Technician and associate professional	Auto Machine Engineer	100			1
	Production Drawing Engineer			100	10
	Ship Design			100	10
	Technician		50	50	6.5
Clerical support staff	Receptionist		100		6
Technical Workers	C & C Operator	100			1
	Cutter man		90	10	5.7
	Electrician	75	25		3.5
	Fitter		77.78	22.22	5.6
	Fiber Laminator	100			3
	Grinder		85.71	14.29	4.9
	Molding Technician			100	10
	Painter	3.57	75	21.43	5.6
	Welder	5.71	80	14.29	5.3
Factory and machine operators and machine assemblers	Crane Driver		100		4
	Machine Man		80	20	5.2
	Operator		100		4
Primary Profession	Helper	33.33		66.67	7.7
	Labor		100		6

Table 88 Extent of Job Displacement that will occur due to automation Technology to the Occupations (%)

BSCO 1-digit Occupations	Occupation Name BSCO-4	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Manager	HRM	100	0	0	5
	Management/Manager	0	100	0	4
Professional	Accountant	0	100	0	5.2
Technician and associate professional	Auto Machine Engineer	0	0	100	1
	Production Drawing Engineer	0	0	100	10
	Ship Design	0	0	100	10
	Technician	0	100	0	6.5

BSCO 1-digit Occupations	Occupation Name BSCO-4	1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean
Clerical support staff	Receptionist	0	100	0	6
Technical Workers	C & C Operator	0	0	100	1
	Cutter man	0	70	30	5.7
	Electrician	25	75	0	3.5
	Fitter	11.11	51.85	37.04	5.6
	Fiber Laminator	100	0	0	3
	Grinder	0	71.43	28.57	4.9
	Molding Technician	0	0	100	10
	Painter	7.14	50	42.86	5.6
Factory and machine operators and machine assemblers	Welder	11.43	54.29	34.29	5.3
	Crane Driver	0	100	0	4
	Machine Man	0	100	0	5.2
Primary Profession	Operator	0	100	0	4
	Helper	0	33.33	66.67	7.7
	Labor	0	0	100	6

Table 89 Extent of Repetitive Work and Percentages of Enterprises that have plan to train its workers to embrace automated technology across Occupations (%)

BSCO 1-digit Occupations	Occupation Name BSCO-4	Extent of Repetitive Work				% Of enterprises Having plan to train workers For embracing Technology
		1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	
Manager	HRM	0	100	0	4	100
	Management/Manager	0	100	0	5	100
Professional	Accountant	33.33	66.67	0	4.5	100
Technician and associate professional	Auto Machine Engineer	0	0	100	10	100
	Production Drawing Engineer	100	0	0	1	100
	Ship Design	100	0	0	1	100
	Technician	0	100	0	4.5	100
Clerical support staff	Receptionist	0	100	0	6	100
Technical Workers	C & C Operator	0	0	100	10	100
	Cutter man	30	60	10	3.9	70
	Electrician	25	50	25	5.3	100
	Fitter	22.22	55.56	22.22	4.9	85.19
	Fiber Laminator	0	0	100	10	100
	Grinder	14.29	57.14	28.57	5.4	42.86
	Molding Technician	0	0	100	7	100
	Painter	7.14	75	17.86	5.7	75
	Welder	20	60	20	5	85.71
	Crane Driver	0	100	0	5	100

BSCO 1-digit Occupations	Occupation Name BSCO-4	Extent of Repetitive Work				% Of enterprises Having plan to train workers For embracing Technology
		1 to 3 (Low level)	4 to 6 (Medium level)	7 to 10 (High level)	Mean	
Factory and machine operators and machine assemblers	Machine Man	20	80	0	4.2	100
	Operator	0	100	0	5	100
Primary Profession	Helper	0	66.67	33.33	6.7	33.33
	Labor	0	100	0	5	0

Annex (SECTION 2.17)

Table 90 Extent of Average Growth in Labor Demand in the next 5-10 years across BSCO Code 4-digit level Occupations

Occupations 4-digit	No Growth	Moderate Growth	High Growth	Very high growth
Senior Executive	43.33	53.33	3.33	0
Finance Executive	14.29	85.71	0	0
HRM	50	50	0	0
SBA	26.42	67.92	5.66	0
Engineer	8.7	82.61	8.7	0
Naval Architect/Archi	0	100	0	0
Accountant	30.43	65.22	4.35	0
Admin	0	100	0	0
Supervisor	16.67	62.5	20.83	0
Technician	0	100	0	0
Marine Engineer	0	100	0	0
Sareng	60	40	0	0
Agent	0	100	0	0
Computer Operator	25	75	0	0
Receptionist	100	0	0	0
Production	0	100	0	0
Store keeper	0	100	0	0
Security	66.67	33.33	0	0
Send Blaster	0	62.96	33.33	3.7
Carpenter	0	60	40	0
Plumber	0	50	50	0
Painter	0	66.67	33.33	0
Welder	1.64	52.46	45.9	0
Lathe Machine Operator	0	50	50	0
Grinder	0	72.73	27.27	0
Electrician	0	80.56	19.44	0
Operator	0	80	20	0
Machine Man	4	68	28	0
Mechanic	0	71.43	28.57	0
Technical Assistant	0	100	0	0
Crane Driver	33.33	66.67	0	0
Peon	9.43	50.94	33.96	5.66
Turner	0	0	100	0
Total	11.09	62.85	25.32	0.74

Table 91 Level of Employment and the projected number of Job Growth across BSCO Code 4-digit level Occupations

Occupations 4-digit	Level of Employment				Growth (%) with respect to current level of employment		
	Current	By 2023	By 2025	By 2030	By 2023	By 2025	By 2030
Senior Executive	82	93	111	135	13.41	35.37	64.63
Finance Executive	42	42	48	62	0.00	14.29	47.62
HRM	14	18	23	27	28.57	64.29	92.86
SBA	139	169	188	237	21.58	35.25	70.50
Engineer	60	106	134	171	76.67	123.33	185.00

Occupations 4-digit	Level of Employment				Growth (%) with respect to current level of employment		
	Current	By 2023	By 2025	By 2030	By 2023	By 2025	By 2030
Naval Architect/Architect	6	11	19	25	83.33	216.67	316.67
Accountant	66	85	104	128	28.79	57.58	93.94
Admin	63	64	66	70	1.59	4.76	11.11
Supervisor	70	90	106	134	28.57	51.43	91.43
Technician	11	16	20	25	45.45	81.82	127.27
Marine Engineer	46	50	58	74	8.70	26.09	60.87
Sareng	8	8	8	10	0.00	0.00	25.00
Agent	8	10	13	15	25.00	62.50	87.50
Computer Operator	7	10	8	15	42.86	14.29	114.29
Receptionist	3	4	5	6	33.33	66.67	100.00
Production	13	20	23	25	53.85	76.92	92.31
Store keeper	2	4	6	8	100.00	200.00	300.00
Security	18	19	21	26	5.56	16.67	44.44
Send Blaster	267	390	482	606	46.07	80.52	126.97
Carpenter	63	78	87	105	23.81	38.10	66.67
Plumber	971	1282	1663	1950	32.03	71.27	100.82
Painter	598	803	986	1281	34.28	64.88	114.21
Welder	1415	1738	2153	2652	22.83	52.16	87.42
Lathe Machine Operator	5	5	7	12	0.00	40.00	140.00
Grinder	175	303	444	586	73.14	153.71	234.86
Electrician	261	447	617	793	71.26	136.40	203.83
Operator	54	98	144	190	81.48	166.67	251.85
Machine Man	219	405	539	697	84.93	146.12	218.26
Mechanic	78	91	94	103	16.67	20.51	32.05
Technical Assistant	1	1	2	2	0.00	100.00	100.00
Crane Driver	16	20	26	32	25.00	62.50	100.00
Peon	1193	1593	1990	2338	33.53	66.81	95.98
Turner	3	3	3	5	0.00	0.00	66.67