Labor Market Study under Skills for Employment Investment Program (SEIP)

ELECTRICAL AND ELECTRONICS SECTOR

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Executive Summary

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

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

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

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

We survey 100 electrical and electronics enterprises and 1340 workers. The novelty of the survey is that it is a worker-linked enterprise survey – workers are drawn from the enterprises surveyed in a systematic way. We followed the sampling method of World Bank- Bangladesh Enterprise Survey (WBES) for representativeness. While we closely followed the structure of the questionnaire of Survey of Manufacturing Industries (SMI) of BBS and World Bank-Bangladesh Enterprise Survey, we also take help of a number of internationally reputed surveys for skill such as the World Bank's Skills toward Employment and Productivity Survey (STEP).

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

Major findings from the enterprise survey

First, we categorize the occupations in five major categories for better conceptualization – managers, professionals, sales and other service workers, technicians and associate professionals and craftsmen and plant workers, following Bangladesh Standard Classification of Occupations (BSCO). The floor workers (craftsmen and plant workers) dominate the distribution of occupations as out of 8701 workers in our sample enterprises, 6273 of them are craft and plant workers, which is about 72 percent of total employees.

While there are 87 workers per enterprise on average, about 62 of them belong to this category. This industry is craftsmen heavy though not as much as the light engineering sector.

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

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

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

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

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

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

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

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

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

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

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

Major findings from the worker survey

The major findings from the worker survey are the following.

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

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

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

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

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

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

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

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

First, we collect information for three quarters: January-March, April-June and July- September. Data show that the enterprises were largely closed during the period of first lock-down and output per enterprise dropped to about meagre 2.5 percent. This drop is even larger for the large enterprises.

However, the employment was not impacted as hard as output as the firms tended to keep their workers during the lockdown and in the subsequent months. However, data on the third quarter – July-September 2020 show that the reduction in output was temporary as the small and medium firms bounced back very strongly compared to the pre-covid period; the pace of recovery of the large enterprises was much slower.

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

Key recommendations

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

General recommendations

I. Broader definition of skill is needed in national plan.
II. Ensure that skill acquisition is a life-long learning.
III. Clear understanding of how skill is formed is required.
IV. Alignment of education and skill development policies with industrial policy and long term plans is required for a holistic approach of skill development.
V. Sector Wide Approach (SWAp) for secondary education and TVET together
VI. Informed Agent: Easily accessible information on skill development opportunities
VII. Greater social recognition for vocational education is required.
VIII. Regular and high frequency data is required to track sector specific skills and skill mismatch.

Sector-specific recommendations

I. Experiences of the large and reputed enterprises in electronics sector should be replicated for others in skilling up the technical personnel.
II. An implementable framework for forging industry-TVET linkage for the electrical and electronics sector is required.
III. A road map for embracing 4IR in the electrical and electronics sector is recommended.
IV. Recommendations for SEIP for designing the second phase
V. Electrical and electronics sector should be a priority.
VI. Greater focus is needed on mid-level to advanced courses.
VII. Right combination of technical vs. management training has to be ensured.
VIII. Soft skills for the workers should be included in the curricula.
IX. Technical institutes should be the prime vehicle for delivery of training through strengthening the current institutes.
X. Right combination of fresh trainees vs. on-job training needs to be ensured.
XI. Partnership with large individual industries should be fostered as they operate on the technological frontier in the country.
XII. Ranking of training institutions can ensure quality and help potential trainees make informed decisions.

XIII. Offering scholarships, on top of tuition waiver, to the trainees can incentivize the potential students.

XIV. Demand side interventions such as mass campaign for popularizing the vocational education are needed to create demand.

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

CHAPTER 1: INTRODUCTION

1.1 Background

Bangladesh has made a remarkable success in achieving a steady and persistent acceleration of growth over the last few decades, with about a one percentage point increase in every decade since the 1980s. Average real GDP growth over the last five years has been above 6.5 percent, which is much higher than the average growth rate of all developing countries (4.7 percent). Recently, in the beginning of FY2015-16 per capita income of Bangladesh has crossed the threshold of USD 1,046 to become a lower-middle-income country. According to the Bangladesh Bureau of Statistics (BBS), per capita income is estimated at US$ $1,751 in FY2017-18. The economy now aspires to attain the high middle-income status by 2030, and developed country status by 2041. To this end, in addition to factor accumulation (capital and labor), the economy requires upgrading the skill base of the labor force to enhance productivity.

It is argued that the contribution of productivity in the production process has been very low in Bangladesh. Almost 99 percent of the growth has been contributed by the accumulation of factors. The risk of growth relying solely on factor accumulation is that at one stage the diminishing marginal return of factors set in, which ultimately leads to a stagnation of growth. Though Bangladesh may be away from reaching the point of diminishing return, the country should consider improving the productivity of the labor force to maintain the high growth now and also to avoid the 'middle-income trap' in future.

The low level of skills and productivity of the Bangladeshi labor is endemic, as indicated by labor force survey data that more than 60% of the labor force has either no education (40%) or only up to primary level (23%). With the approval of the National Education Policy (NEP), 2010 and the National Skill Development Policy (NSDP), 2011, the government embarked on major education and training reforms. In 2014 the government of Bangladesh has initiated the Skills for Employment Investment Program (SEIP), a multi-tranche financing facility supported by the Asian Development Bank (ADB) and the Swiss Agency for Development and Cooperation (SDC), anchored in the National Skills Development Policy (NSDP), 2011. Under first and second tranche, 223,000 have been trained and certified with a job placement rate of nearly 70 percent. The combined training target under the first two tranches is 502,000. Female participation among trainees is more than 30 percent.

Against this backdrop, SDCMU of Ministry of Finance has requested BIDS to conduct a study of the labor market for Skill for Employment Investment Project (SEIP). This study on the electronics sector is one of the sectors under component 3.

1.2. Objective of the Study

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

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

1.3. Overview of the Sector

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

Unique characteristics

The emergence and growth of the electrical and electronics sector have some unique characteristics, unlike RMG.

Emerged and thrived in a very competitive environment.

This industry has sprung during the time when China remains omnipresent in the global manufacturing market. India, being the overarching neighbor, has always been a threat to the growth of local industries. Local industries have emerged and thrived competing with the cheap Chinese and Indian imports in a very liberal tariff regime.

Defied natural competitive advantage.

This sector had to challenge the natural comparative advantage of the country, which is the cheap unskilled labor, and invested in discovering the 'latent' comparative advantages.

Importantly, this apparent comparative-advantage-defying activities have not been the outcome of direct government's aspiration to crate 'national champions' – the hyper- nationalistic drives that resulted in numerous failed cases in the past across the globe (e.g., China, Senegal, Zambia's failed experiments with automobiles during 1950-1970). The process of 'self-discovery' of the electronics sector, for example, has been completely a private sector led initiative.

Step by step transformation

Third, unlike RMGs which were "born to export", a large number of the firms have followed the following full sequence of transformation or a part of it to become manufacturers and exporters.

Retailer Importer/wholesaler Assembler Manufacturer Exporter

Walton started its journey as a retailer under the name of "Rezvi and Brothers" in 1977 and went through all the steps depicted above to become a manufacturer in 1999 and exporter in 2010. On the other hand, RFL started its journey in 1980 producing cast iron (CI) products and later diversified into plastics, electronics and a wide range of other consumer durables. In this case, the transformation from one stage to the next varies with product

lines. This kind of up-gradation of products and processes at a mass scale is something that the manufacturing sector of the country has not seen before.

I. Imitative entry is not possible for more technologically sophisticated industries

As we know, the success of RMG was due to a combination of luck, dynamic entrepreneurship and government support. The imitative entries were possible due to the low tech nature of the industry. But this kind of imitation and replication are very unlikely to take place in more sophisticated industries such as light engineering and electronics.

A. Size of the market and future growth

Defining the boundary of the electrical and electronics sector is a complicated task. A working definition is that anything that uses an electrical circuit can be included under electronics and electrical sector. In our study, we include both consumer (e.g., TV, refrigerator, etc.) and capital goods (e.g. transformer). There is no official estimates available for the size of this sector in Bangladesh. However, according to Bangladesh Investment Development Authority (BIDA), the size of the market for both industrial and consumer electronics was about USD 5.29 billion in 2019. The expected growth rate is about 15 percent per annum and consumer electronics sector is expected to grow faster than that of industrial capital goods. The market for only consumer electronics stood at USS 2.4 billion in 2020 and it is projected to grow to USS 10 billion by 2030. The future growth of the consumer electronics will be driven by the rural consumers – about 100 million rural people will buy these goods for the first time or upgrade models in the next 10 years. This poses a tremendous growth of this sector in future and we observe foreign brands are also competing for this market. There are about 3000 factories involved in this sector employing about 1 million people.

B. What the sector is producing?

i. Consumer goods

Fans, bulbs, mobile phones, refrigerators, air conditioners, televisions, electronic fans, radios, DVDs and CD players, ovens, blenders, and other household appliances.

ii. Capital goods.

Accumulators, transformers, generators, circuit breakers, diodes, lifts, etc.

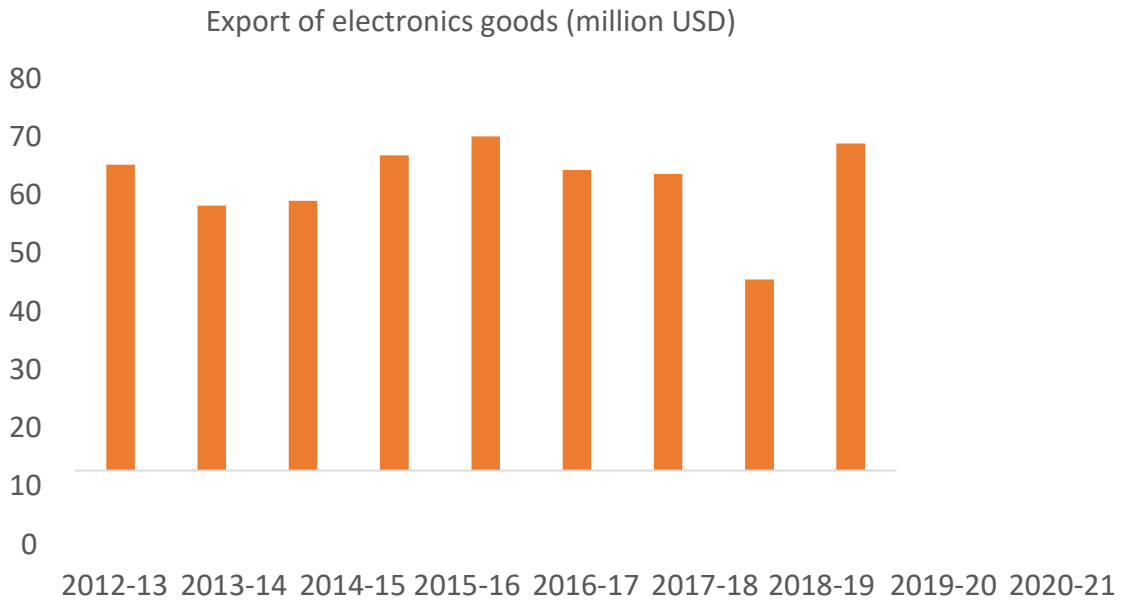
C. Major brands with local production units

Sl. No.	Manufacturer	Factory Location	Products
1	Walton	Kaliakoir , Gazipur	Home appliances, smartphones & computers
2	Samsung (Technical Collaboration with Fair Electronics)	Shibpur , Narshingdi	Home appliances & smartphones

Sl. No.	Manufacturer	Factory Location	Products
3	Samsung (Technical Collaboration with Transcom Electronics)	Mohakhali, Dhaka	TV assembling
4	Minister Hi-Tech Park	Gazipur and Trishal , Mymensingh	Home appliances
5	Jamuna Electronics	Gazipur	Home appliances
6	Transsion Holdings	Vogra, Gazipur	Smartphones
7	LG (Technical Collaboration with Butterfly)	Bhaluka, Mymensingh	TV & refrigerator
8	RFL Electronics	Narshingdi	TV, RAC & Home appliances
9	Oppo	Vogra, Gazipur	Smartphones
10	Vivo	Rupganj, Narayanganj	Smartphones
11	Realme	Vogra, Gazipur	Smartphones
12	MNH Industries Ltd.	Barishal , Barishal	TV & refrigerator
13	Singer Bangladesh	Savar, Dhaka	Home Appliances
14	Techshop Bangladesh	Kawranbazar, Dhaka	Robotic,Electronics
15	5 Star Mobile	Gazipur	Smartphone and feature phones
16	Xiaomi, Redmi and POCO (Technical Collaboration with DBG Technology BD Ltd.)	Gazipur	Smartphones & smart devices
17	Nokia-HMD (Technical Collaboration with Vibrant Software)	Bangabandhu Hi-Tech City, Gazipur	Smartphones and feature phones

Exports

Exports of electronics sector bounced back to the pre-covid level and exported USD 68 million in 2020-21. This indicates that there is an ample opportunity to grow beyond domestic demands.



CHAPTER 2: CONCEPTUAL ISSUES

This brief concept note will help sharpen our understanding of various issues, forms and measurements of skill mismatches which are used in this report.

2.1 Soft vs. Hard skill

Soft skills include non-cognitive abilities or personality traits such as teamwork, communication, work ethic, time management, work under pressure, etc. As there is increasing evidence on the high return of soft skills, we also consider soft skills in this study.

2.2 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 is required for the particular job they are working in, 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 the output that 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 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.

2.3 Forms of Skill Mismatch

Skill Gap

Skill Gap is a firm-level measure of skill mismatch based on the 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 the 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.

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 the 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 into 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 to those required for their current jobs. In the case of job vacancies, the measure relates to the degree to which applicants' education levels meet the hiring requirements. This is also known as a vertical mismatch.

Horizontal Mismatch

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

2.4 Measurement Issues of Skill Mismatch

Skill Gap

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 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 the 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 the literature. Each method has its 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 is the level of qualifications 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 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 applies to existing micro datasets, such as the 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 titles (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 is 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; Allen and de Weert 2007).

CHAPTER 3: APPROACH AND METHODOLOGY

3.1 Sampling Strategy and Sample Size

Following World Bank-Bangladesh Enterprise Survey (WBES) 2013 method, we estimated the sample size and conduct the survey. Once the total sample is selected, we will stratify them in size and geographical concentration. We took the help of the local business associations to locate the enterprises.

The sampling formula of the World Bank's Enterprise Survey is given by

$$n=\left[\frac{1}{N}+\frac{N-1}{N}\frac{1}{PQ}\left(\frac{K}{Z_{1-\frac{\propto}{2}}}\right)^2\right]^{-1}$$

Where,

n= sample size

N= population size

P= population proportion

Q= 1-P

K= desired level of precision

$Z_{1-\frac{\propto}{2}}$ = The value of the normal standard coordinate for the desired level of confidence

1-α. Following WBES, we assume k = 7.5%, α=10%, and P=0.5 for all sectors

According to SME-cluster mapping 2017, there are three clusters of electronics and electrical sectors in the Dhaka division, comprising 286 enterprises. Surprisingly there is hardly any published and unpublished source of information that can be used as a sampling frame for the Electronics Enterprises Study. We, therefore, drew a sample using primarily on the SME cluster mapping, Bangladesh TV manufacturers association, Bangladesh mobile phone manufacturers association, Bangladesh refrigerator manufactures association, Bangladesh electronic manufacturers association etc. We surveyed 100 enterprises following the formula used by WBES.

Questionnaire Design

Two standardized questionnaires are used – one for enterprise and the other for employees. We closely followed the structure of the questionnaire of Survey of Manufacturing Industries (SMI) of BBS and World Bank-Bangladesh Enterprise Survey (WBES) 2013 for the basic variables of enterprises such as output, inputs (land, labor, capital, and raw materials), technology, financing, and markets (input and output). We will have separate modules to capture different forms of skill mismatch discussed above. We particularly took the help of the following surveys conducted in other countries, for both enterprises and employees.

The World Bank's Skills Toward Employment and Productivity Survey (STEP)

The ILO's School to Work Transition Survey (SWTS)

Cedefop's European Skills and Jobs Survey (ESJS)

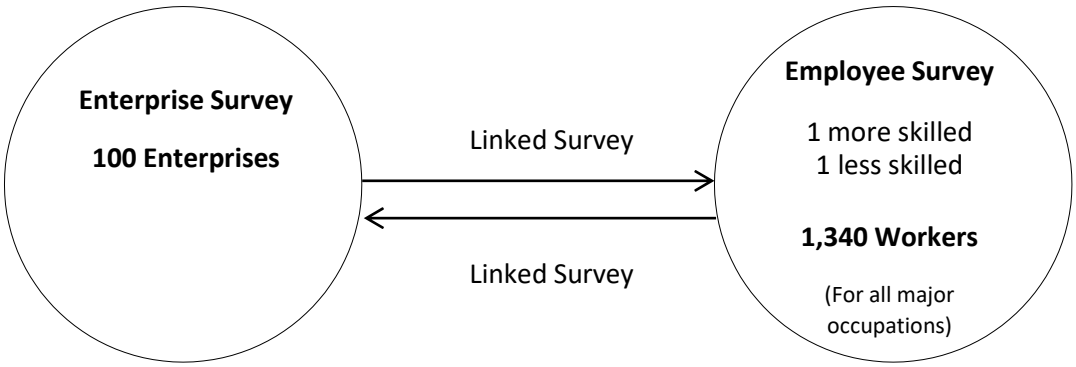
OECD's Survey of Adult Skills (PIAAC) Reflex Project1

[1] The Reflex project is a large-scale European survey of education on graduates. The fifteen participating 0countries are Austria, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, the UK, Czech Republic, Portugal, Switzerland, Japan, Estonia and Belgium-Flanders. Linked Worker Survey

We conducted a linked survey – enterprise linked worker 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 upgrading skills.

We picked two employees from each occupation/task with the consultation of the manager in such a way that one is a relatively more skilled one and the other is the less skilled in the manager's view since the manager/employer knows best about the level of skill of his or her workers. Following this method, we survey 1340 workers from 100 enterprises, about.

3.2 workers per enterprise.



Employer/Manager will identify the more and less skilled workers

Scope of Survey: Regions and Products

To capture the regional distribution of the enterprises and the variety of products they produce; we follow Economic Census 2013 closely. The following Table 1 highlights how our sample is distributed across regions and products. Although concentrating primarily on the three clusters of Dhaka, we did not follow the mapping entirely. This is because the SME cluster mapping did not consider a lot of newly established enterprises along with some of the major manufacturers of the sector. The range of products we consider includes light, fan, television, refrigerator, AC and compressors, consumer electronics (including washing machine, induction cooker, microwave oven, blender, Iron, electric kettle, electric stove, rice cooker), electric meter, and lift.

Table 1 : Region and product-wise distribution of sample (no. of enterprises)

Products	Dhaka- Gazipur	Narayanganj	Narshingdi	Tangail-Mymensingh-Khulna	Row total
Light	10	1	0	0	11
Fan	22	2	0	0	24
Television	2	0	1	0	3

Products	Dhaka- Gazipur	Narayanganj	Narshingdi	Tangail-Mymensingh-Khulna	Row total
Home appliances	5	0	7	0	12
AC, Fridge & Compressor	3	0	1	2	6
Battery and Generator	6	0	1	1	8
Transformer	32	0	0	1	33
Electric Meter	1	1	0	0	2
Lift	1	0	0	0	1
Column Total	82	4	10	4	100

CHAPTER 4: FINDINGS FROM ENTERPRISE SURVEYS

4.1 Structure of enterprises and employment

Table 2: Structure of the enterprises

	Large	Medium	Small	Full sample
No. of enterprises	33	33	34	100
Total Employment	6926	1169	606	8701
Employment per enterprise	209.88	35.42	17.82	263.13
Output per enterprise (Billion Taka)	2.961	0.084	0.082	1.032
Capital stock per enterprise (Billion Taka)	0.37	0.06	0.02	0.15
Capital-labor ratio per enterprise (Million Taka)	73.47	54.59	42.09	56.72

We divide all enterprises into three groups according to the size (employment). Enterprises with 1 to 23 workers are small enterprises, 24 to 53 are medium enterprises and 54 and above are large enterprises. In our sample, 34 enterprises are large, 33 enterprises are medium and 33 are small. These 100 enterprises employ 8,701 workers, about 87 workers per enterprise. In the case of large, medium and small enterprises, employments per enterprise are 210, 35 and 18 respectively. The average total output is 41 million Taka with large enterprises producing 2.961billion Taka, medium 0.084 billion Taka and small 0.082 billion Taka. As expected, capital stock is also higher for the larger enterprises – 0.37 billion Taka, whereas the average is 0.15 billion takas for all enterprises. The average capital-labor ratio is 56.72 million Taka and larger firms are more capital intensive than the small and medium ones. However, it is interesting to note that there is not much difference between the small and medium firms in terms of capital-labor ratio.

Table 3: Structure of Employment

Occupation	Total Employment	Employment per enterprise	Monthly avg. salary (Taka)	Share of female workers	Share of permanent workers (%)	Share of full-time workers (%)
Manager	220	2.20	18006.85	0.00	0.98	1.00
Professional	126	1.26	15961.11	0.02	0.99	0.99
Sales and clerk	380	3.80	11203.27	0.04	1.00	0.99
Technician	1712	17.12	12182.05	0.01	0.99	0.99
Craft and others	6263	62.63	8631.22	0.02	0.99	1.00
Full sample	8701	87.01	13196.90	0.02	0.99	0.99

Since the objective of our work is to understand the level of skill and skill mismatch, it is imperative to shed some light on the structure of the employment and the extent of formality. We also categorize the occupations in five major categories for better conceptualization – managers, professionals, sales and other service workers, technicians and associate professionals and craftsmen and plant workers. The definition of each category with example is provided in

Table 21. As we see in Table 3, in the electronics sector, the major occupation is the craft and plant workers. In our total sample of 8,701 workers, 6263 of them are craft and plant workers, which is about 72 percent of total employees. While there are 87 workers per enterprise on average, about 62 of them belong to this category. There are about 17 technicians and associate professionals, and about 4 sales workers in an enterprise. This sector does not employ many professionals – only one professional in four enterprises. There are about 2.2 persons per enterprise working as managers.

The average monthly salary of all workers is Taka 13,197. Note that we only surveyed the floor workers. Hence the occupation "manager" largely includes supervisors and floor in- charge. The manager is the highest-paid occupation as they received about 18 thousand takas. There is not much difference in salary between the associate professionals and sales & clerks, receiving about 12 thousand and 12 thousand takas respectively. The professionals are paid about 16 thousand takas per month. The craft and plant works, who constitute about 72 percent of the total workers, are the least paid and receive about 8 and half thousand taka per month.

Electronics is a male-dominated sector – only 2 percent of the workers are female. Most of the workers are permanent workers - 99 percent. About 99 percent of the workers are full- time workers.

4.2 Extent of Formality

Table 4: Extent of formality

Occupation	Total employment	Workers with paid overtime (%)	Share of permanent workers with a written contract	Share of workers with weekly paid leave	Share of workers with paid sick leave	Share of workers with monthly paid leave
Manager	220	62.18	0.76	0.11	0.11	0.09
Professional	126	0.00	1.00	0.50	0.50	0.50
Sales and clerk	380	29.41	0.62	0.35	0.35	0.16
Technician	1712	56.25	0.14	0.07	0.07	0.05
Craft and others	6263	64.77	0.33	0.25	0.24	0.17
Full sample	8701	42.52	0.57	0.25	0.25	0.19

Table 4 is about the extent of formality of the workers. It is reported that about 42.52 percent of the workers work overtime and they are paid for it. Of the total workers, 57 percent are reported to have formal contracts of the jobs. Managers and professionals are the ones with the highest share of occupations with formal contracts – 76 percent of the managers and 100 percent of the professionals have formal contracts. Only 33 percent of the craft and plan workers have formal contracts. This figure is 62 percent for sales related workers and 14 percent for associate professionals. Only 25 percent of the workers enjoy weekly paid leave – this share is the highest for the professionals (50 percent) and the lowest for the technician and associate professionals (7 percent). About 25 percent of the workers are reported to receive paid sick leave. This share is only 24 percent for the craft and plant workers. For other occupations, the percentage varies from 7 to 50 percent. Only 19 percent of the workers receive monthly paid leave. Similar to other

paid leave, craft and plant workers enjoy the lowest and managers get the highest.

4.3 Skill Mismatch: Horizontal and Vertical

In section 2, we detailed the concept of horizontal and vertical mismatch. In short, horizontal mismatch captures the discrepancy between the desired field of study by the employers and the actual field of study of the current workers. On the other hand, vertical mismatch captures the mismatch between the desired level of education (years of schooling) by the employers and the actual level of education of the workers. When the desired level is higher than the actual, we call it under-education and when the desired level is lower than the actual, it is over-education. Table 5 describes the desired field and level of education while Table 6 shows the actual level of the current workers. We calculate the discrepancy between these two and report the horizontal and vertical mismatch in Table 7.

Table 5: Desired level of qualification from the workers

Occupation	Total Emp.	Share of desired qualification (science)	Share of desired qualification (Arts)	Share of desired qualification (Commerce)	No preference for field of education	Desired level of education (Years)	Desired level of experience at entry (Years)
Manager	220	0.25	0.00	0.04	0.71	11	4.7
Professional	126	0.67	0.00	0.33	0.00	8	1.8
Sales and clerk	380	0.08	0.00	0.02	0.90	5	3.7
Technician	1712	0.30	0.00	0.00	0.70	5	4.7
Craft and others	6263	0.00	0.00	0.00	1.00	3	3.2
Full sample	8701	0.20	0.00	0.03	0.76	6	3.6

Table 5 shows the desired field and level of education, as well as experience of the workers at the entry-level by the employers. We use four types of employers' preferences towards the field of study- science, arts, commerce and no choice. 20 percent of the owners want workers from science backgrounds. This percentage is the highest for the professionals. The preference for science is zero for the crafts and plant workers. This is very low for the associate professionals as well (30 percent). Interestingly, there is no preferences for arts background. The demand for workers with commerce background is the highest for the professionals –33 percent, followed by mangers (4 percent). However, overwhelmingly, there is no strong preference for a field of study by employers in the electronics sector. 76 percent of the employers think that they are indifferent about the field of study of the workers. This amount is 100 percent for the craft and plant workers. This suggests that learning by doing through on-job training is the major way of skilling the workers which require little academic learning. 76 percent of the owners are indifferent about sales-related workers' field of study and this figure is 70 percent for the associate professionals and technicians. Note that, the field of study matters only for those who passed at least SSC or equivalent examinations.

On average, the desired level of education is only about grade 6 for all workers. The employers demand grade three equivalent levels of education for the craft and plant workers. This figure is slightly higher for associate professionals and technicians. Sales related workers are expected to have a similar level of education. The desired level of education of the managers is about 11

years.

There is a demand for experience of the employees at the entry level. On average, employers want about 3.6 years of experience. This is highest both for the managers and technicians – 4.7 years. Employers desire slightly fewer years of experience in sales related works (3.7) than in craft and plant works (3.2). The desired level of experience for the professional workers is the lowest (1.8).

Note that the electronics sector is highly heterogeneous in terms of size and technological sophistication. Hence, we also conducted separate analysis for large and small industries. The large industry is defined at the bottom of the respective tables. Table A4.1 and A4.2 of the appendix section shows the desired field and level of education, as well as experience of the workers at the entry-level by the employers of the large and small firms respectively. While comparing the preferred field of study of the workers of various occupations, we can see that a higher percentage of the large firms prefer managers, professionals, and technicians from science backgrounds. Interestingly, the opposite can be seen when it comes to the preference for the workers belonging to the occupational group crafts and others. When it comes to the desired level of education, for all the occupation categories except the 'crafts and others' category the large firms desire higher years of educational attainment. One noticeable thing is, the difference is not very high. For the total sample this is only 0.74 years between the large and small firms. The same pattern is not seen when it comes to the desired level of experience. On average, the desired level of experience for the large firm is 1.72 years lower than the small firms and the gap is highest for the 'sales and clerk' category. This indicates the fact that the large firms might value in-house experience more than the small firms.

Table A4.3 of the appendix section shows the desired field and level of education, as well as experience of the workers at the entry-level by the employers at the detailed occupational categories (digit 2). From the table, it is apparent that the employers have preferences for educational background for senior posts such as managers and professionals. However, in most cases, for the floor workers, there is no preference for the field of education. When it comes to the desired level of education in years, professional positions like engineers, accountants are expected to have at least a bachelor's degree. The same is not true for the post of managerial positions. Having a post-secondary degree is sufficient for these positions. One noticeable thing is for the floor workers who operate complicated machinery like hydraulic press machine, power press machine, trimming machine, educational qualification of 10 years (Secondary School passed) is desired. For the other floor workers, this is slightly lower; for most other floor workers primary school passes are desired. When it comes to the desired level of experience at the entry-level, for sales officers the value is the highest, followed by the managerial positions. Surprisingly, for most of the floor workers, this value ranges from one to two years. It is quite apparent that firms value in-house experience more.

Table 6: Actual qualification

Occupation	Total Employment	Average qualification level(Science)	Average qualification level (Arts)	Average qualification level (Commerce)	Average qualification level (None)	Years of edu.	Average years of experience at the entry-level
Manager	220	0.187	0.388	0.209	0.216	9.4	4.2
Professional	126	0.059	0.118	0.588	0.235	7.4	3.0

Occupation	Total Employment	Average qualification level(Science)	Average qualification level (Arts)	Average qualification level (Commerce)	Average qualification level (None)	Years of edu.	Average years of experience at the entry-level
Sales and clerk	380	0.043	0.196	0.065	0.696	4.1	3.7
Technician	1712	0.061	0.149	0.009	0.781	3.9	1.9
Craft and others	6263	0.015	0.026	0.006	0.953	2.0	2.8
Full sample	8701	0.073	0.175	0.175	0.576	5.4	3.10

Table 6 takes stock of the current level of education, the field of study, and years of experience for the electronics sector. About 58 percent of the workers do not have any field of study, largely due to their low level of education. Mangers are mostly from arts background – 39 percent of the managers are from arts; 21 percent are from commerce and 19 percent from arts. Professionals are mostly from a commerce background (59 percent). 5.9 and 12 percent of them are from science and arts respectively. Most of the sales-related workers do not have any field-specific education (65 percent), with 19.6 percent from arts. 78 percent of the associate professionals and technicians also have no field of study; only 15 percent are from arts. Similarly, among the craft and plant workers, 95 percent are with no subject-specific background.

The average years of schooling for the full sample is 5.4 years. Managers have 9.4 years and professionals have 7.4 years of schooling. One notable this is for all other professions, the average is about 4 years and below. Craft and plant workers have only 2 years of education. Associate professionals and sales-related workers have around 4 years of education.

The average years of experience of the workers are 3.10 years. Craft and plant workers have 2.8 years of experience on average and sales workers have 3.7 years. Average years of experience are between 1.9 to 4.2 years for other occupations.

Table A5.1 and A5.2 of the appendix section shows the actual field and level of education, as well as experience of the workers of the large firms and small firms respectively. While comparing the background of the field of study of the various occupations, we can see that a significantly higher percentage of the large firms have managers, technicians, and crafts & other workers who are from science and arts backgrounds. In the case of the small firms, Interestingly, for most of the occupation groups except the professional, a significant percentage of the workers came from a more general stream of education, i.e., without a specific field of study. In the case of the actual years of education, on average, the workers of the large firms have about 3 additional years of education. The gap is higher for the professional, technician, and floor workers. The opposite scenario can be seen in the averageyears of experience at the entry-level. The average years of workers of the large firms at theentry-level are 9 months lower than the small firms.

Table A5.3 of the appendix section shows the field and level of education, as well as experience of the workers at the entry-level at the detailed occupational categories. The table shows that the field of about one-fourth of managers are from a science background. Another notable thing is, there might be some mismatches of the field of study among the professionals. For example, only 45 percent of accountants are from a commerce background. When it comes to educational attainment, the workers in

professional positions like engineers and accountants on average have a bachelor's degree. The same is not true for the post of managerial positions. Having a post-secondary degree is sufficient for these positions. One noticeable thing is for the floor workers who operate complicated types of machinery like hydraulic press machine, power press machine, trimming machine, educational qualification is higher. When it comes to the years of experience at the entry-level, for the technical and sales workers the value is slightly higher than the other professions. However, overall, the values range from 1 to 4 years, which is quite low.

Table 7: Horizontal and vertical mismatch

		Vertical mismatch (Years of schooling)			Horizontal mismatch (field of study)
Occupation	**Total Employment**	**Total**	**Over Qualification**	**Under qualification**	
Manager	220	0.49	0.08	0.40	0.14
Professional	126	0.28	0.09	0.19	0.09
Sales and clerk	380	0.28	0.02	0.26	0.06
Technician	1712	0.42	0.05	0.38	0.19
Craft and others	6263	0.27	0.04	0.23	0.05
Full sample	8701	0.35	0.06	0.29	0.11

We observe a significant discrepancy between the desired fields of education and actual level of education from Tables 5 and 6. The actual level of education is about a year lower than what is expected by the employers for all workers. This gap is higher for the technology- related workers than the management related workers. There is also a higher demand for workers with science backgrounds than the enterprises actually have.

To shed more light on this mismatch, Table 7 identifies both the vertical and horizontal mismatches based on Table 5 and Table 6. First, consider vertical mismatch. On average, we find a 35 percent vertical mismatch for the full sample. This implies that the reported discrepancy between the desired level and actual level is 35 percent. This mismatch is the highest for the management and technology-related workers - 49 percent for the managers and 42 percent for the associate professionals and technicians and only 27 percent for the craft and plant workers. The enterprises experienced a 28 percent of vertical mismatch both for the professionals the sales-related workers.

As discussed above, we also divide the vertical mismatch into over and under qualification. For the full sample, under-qualification dominates over-qualification. That is, the employers demand more years of education than they actually have. The share of under qualification for the full sample is 29 percent and over-qualification is 6 percent. Again, the incidence of under-qualification is the highest for the management and technology related workers such as managers (40 percent) and associate professionals and technicians (38 percent).

As expected, the horizontal mismatch is lower than the vertical mismatch as most of the workers have education well below the level of choosing fields. We find that there is 11 percent of horizontal mismatch. This mismatch is the highest for the technician and associate professionals (19 percent) and the lowest for the craft and plant workers (5 percent).

For a detailed picture of this mismatch, Tables A6.1 and A6.2 identify both the vertical and horizontal mismatches of the large and small firms. The vertical mismatch for the small firms is 13 percent higher

than the large firms. For the large firms, the vertical mismatch is the highest for the floor workers, three out of four floor-workers (i.e. 'craft and other' occupation group) are either under or overqualified for their job. For the small firms, the vertical mismatch is the highest for the professionals, followed by technicians and floor workers. Another noticeable thing is, about 84 percent of the workers in the small firms are under- qualified, which is significantly higher than that of the large firms (only one-fourth of the mismatched workers). When It comes to vertical mismatch, the percentage is higher (about16 percent more) for the small firms. The vertical mismatch is higher for the managerial andsales and craft workers for both types of firms

Table A6.3 depicts both the vertical and horizontal mismatches of workers at detailed occupational categories. From the table, it is apparent that for the relatively sophisticated floor workers (e.g. Welders, EDM machine operators, weaving machine operators, etc.) thepercentage of the vertical mismatch is the highest. Another notable thing is, most of these vertically mismatched workers are under-qualified. The percentage of vertical mismatch is also quite high for managers and administrative officers. When it comes to horizontal mismatches. Mainly managerial, professional, and technical positions seem to have some degree of horizontal mismatch.

4.4 Skill Shortage

We use the conceptual framework outlined in section 2 to capture skill shortages in theelectronics sector. Following this conceptual note, we create the following table.

Table 8: Difficulties in filling up vacancies

Occupations	Total Employment	Number of unfilled vacancies per enterprise	Difficulties in filling up vacancies (1 to 10 scale)	If a vacancy is occurred/posted/advertised today, how long will it take to fill up the position?			
				Almost instantly	Less thana week	More than a week and less than a month	A month or more than a month
Manager	220	0.21	6.39	0	1.08	23.66	75.26
Professional	126	0.11	5.70	5.56	11.11	44.44	44.45
Sales and clerk	1712	3.11	6.65	1.13	3.95	59.89	36.16
Technician	380	1.08	5.75	5.48	9.59	67.12	23.29
Craft and others	6,263	10.32	6.27	2.72	17.09	67.96	14.95
Full sample	8,701	9.74	6.30	2.22	11.09	56.49	32.42

Table 8 shows that at the time of the interview, about 10 posts per enterprise were vacant. This vacancy is the highest for crafts and plant workers (10.32), followed by the sales and clerks (3.22). We asked the respondents to pick a number between 1 and 10, with higher the number, higher the difficulties to fill up the vacancy. For the full sample, this is 6.30. This score is only 6.27 for the craft and plant workers. This figure ranges from 5.170 for professional workers to 6.65 for sales and clerks. We then explored it more by asking if a vacancy occurs/posted/advertised today, how long it will take to fill up the position. On average, for all occupations, 56.49 percent of the firms reported that it would take more than a week but less than a month and 32. 42 percent reported that it would take a month or more. In the case of craft and plant workers, about 85 percent of the firms opined that they could hire workers in less than a month. Managers are relatively hard to recruit as it takes morethan a month in more than three-fourth of the

cases.

Tables A7.1 and A7.2 show on average the small firms find it slightly harder (o.25 higher ona scale of 1 to 10) to fill up any new vacancy. While comparing the level of difficulty in fillingup the vacancies, it can be seen that the small firms find it easier to find managers and technicians. For the workers belonging to professional and 'crafts and others' categories it is slightly harder for the small firms. From the table, it is apparent that the small firms take a longer time to fill up any vacancies. For the small firms about 28.14 percent of the total vacancies take one month or more to fill up compared to 21.33 percent for the large firms. Another notable thing is; that small firms find floor workers faster than large firms.

From table A7.3 detailed occupation category-wise difficulties in filling up vacancies can beseen. From the table, we can see that sales and marketing officers are the hardest to replace. Besides, floor workers who deal with sophisticated machinery like Crane gradingworkers, welders, painting machine operators are also hard to replace. From the table, it isapparent that the vacancies for the managerial positions take the longest to fill-up. For most other occupations, the average duration to fill up the vacancies is more than a weekand less than a month.

Table 9: Reasons for hard to fill-up vacancies (those who scored between 7 and 10 on a 1-10scale)

	No. of firms reporting why it is hard to fill up blank posts	Poor payment and other facilities	Low number of applicants withthe required skills	Low number of applicants with required attitude and motivation	Low number of applicants in general	Less work experience than the firm demands	Too much competition from other employers
		(%)	(%)	(%)	(%)	(%)	(%)
Manager	46	36.73	44.9	75.51	28.57	57.14	30.61
Professionals	6	50	100	100	50	66.67	50
Technician	71	42.86	58.93	77.68	33.04	54.46	33.93
Sales and	13	69.23	46.15	61.54	30.77	15.38	30.77
Crafts and other	89	49.77	62.67	66.36	52.07	63.59	25.35
Total	100	46.85	59.45	71.03	43.07	58.69	28.97

Now we asked the respondent to consider the cases for which scores on the difficulty level offilling up vacancies is higher than 7 (7-10). These are the cases of hard to fill vacancies. Based on pre-survey piloting, we gave them 6 major options. About 59. 45 percent identified that alower supply of skills is a major reason for skill shortage. This percentage is 100 percent forthe professionals. Poor payment has not been a major factor relative to others – only 46. 85percent thought that this is an issue. Lack of motivation of the applicants has been held responsible by about 71 percent. About 58.69 percent thought that job seekers come with less experience than demanded and causing skill shortage. Compared to other factors, competition from other firms is also not seen as a big threat for hiring workers, compared toother causes.

4.5 Impact of skill shortage on enterprises

We now try to find out the impact of skill shortage on the electronics firms. In this case, also,we gave the respondents several scenarios and asked them if such scenarios have zero impact, some impact, moderate impact, high impact and very high impact.

Table 10: Impact of skill shortage on enterprises

	No. of firms reporting why it is hard to fill up blank post by occupation. (Impact)	Faced loss in sales or order due to competition(Domestic/ International)					Delay in developing the quality of product				
		No Impact	Some impact	Moderat eimpact	High impact	Very high impact	No Impac t	Som e impac t	Moderat eimpact	High impac t	Very high impac t
Manager	53	14.0 4	49.1 2	24.5 6	12.2 8		36.84	35.09	21.0 5	3.51	3.51
Profession al	45	7.41	22.2 2	42.5 9	11.1 1	16.6 7	16.67	22.22	25.9 3	27.78	7.41
Technician	85	6.49	25.3 2	38.9 6	20.1 3	9.09	12.34	22.73	37.0 1	19.48	8.44
Sales and clerk	24	16	20	28	20	16	8	16	40	12	24
Crafts and other	91	12.7 3	29.5 9	43.0 7	12.3 6	2.25	24.72	22.85	29.2 1	19.48	3.75
Total	100	10.7 7	29.2 6	39.3 2	14.7 2	5.92	21.01	23.7	30.7	18.31	6.28

Skill shortage is reported to have a moderate impact on sales due to competition and this islargely due to a shortage of crafts and plant workers as well as professionals. Skill shortage in sales-related workers is largely held responsible for the moderate impact of delay in developing quality products.

Table 11: Impact of skill shortage on enterprises (continued)

	Have difficulties maintaining standard quality					Experienced an increase in operating cost				
	No Impact	Some impact	Moderate impact	High impact	Very high impact	No Impact	Some impact	Moderate impact	High impact	Very high impact
Manager	29.82	50.88	19.3			21.05	26.32	29.82	22.81	
Professionals	27.78	20.37	31.48	16.67	3.7	33.33	16.67	27.78	18.52	3.7
Technician	22.08	18.83	38.31	14.29	6.49	22.08	23.38	31.82	20.13	2.6
Sales and clerk	12	24	40	16	8	32	16	24	24	4
Crafts and other	29.59	23.97	38.2	5.62	2.62	26.59	19.1	29.21	23.97	1.12
Total	26.57	24.96	35.73	8.98	3.77	25.67	20.65	29.62	22.26	1.8

Skill shortage of the professionals, associate professionals and craft and plant workers are found to have a moderate impact on maintaining the quality of the products and an increasein operating costs.

Table 12: Impact of skill shortage on enterprises (continued)

	Have difficulties introducing new work practice					Increased workload on other workers				
	No Impact	Some impact	Moderate impact	High impact	Very high impact	No Impact	Some impact	Moderate impact	High impact	Very high impact
Manager	21.05	40.35	36.84	1.75		14.04	40.35	36.84	8.77	
Professionals	20.37	11.11	44.44	20.37	3.7	14.81	16.67	12.96	25.93	29.63
Technician	13.64	25.97	33.77	21.43	5.19	12.34	22.08	35.71	16.23	13.64
Sales and clerk	8	16	40	32	4	8	40	28	16	8
Crafts and other	22.47	14.98	41.95	19.48	1.12	5.99	20.97	21.35	23.97	27.72
Total	19.03	20.29	39.32	18.85	2.51	9.52	23.7	26.39	20.11	20.29

Again, the shortage of technical workers is reported to have a moderate impact on introducing new work practice whereas in the case of an increase in workload the types of impact are quite evenly distributed.

Table 13: Impact of skill shortage on enterprises (continued)

	Have to outsource work					Withdraw from offering certain products orservices altogether				
	No Impact	Some impact	Moderate impact	High impact	Very high impact	No Impact	Some impact	Moderate impact	High impact	Very high impact
Manager	91.23	1.75	7.02			54.39	36.84	8.77		
Professionals	83.33	1.85	9.26	5.56		53.7	11.11	25.93	7.41	1.85
Technician	84.42	3.9	9.09	2.6		38.96	22.73	29.87	5.84	2.6
Sales and clerk	100					36	28	24	8	4
Crafts and other	79.78	4.87	10.86	4.12	0.37	55.43	14.23	25.84	4.49	
Total	83.48	3.77	9.34	3.23	0.18	49.73	19.21	25.13	4.85	1.08

Skill shortage has not been found to push firms to outsource works much. However, some withdrawal of products due to skill shortage has been reported.

4.6 Coping with Skill Shortage

Table 14: Coping of the firms with skill shortage

	No. of firms reporting why it is hard to fillup blank post by occupation	Will address skill shortage?	Increasing salary	Increasing number of training	Redefining existing jobs	Increasing expenditure on adv. or recruitment	Using new recruitment methods
		(%)	(%)	(%)	(%)	(%)	(%)
Manager	52	100	87.5	48.21	73.21	39.29	51.79

	No. of firms reporting why it is hard to fillup blank post by occupation	Will address skill shortage?	Increasing salary	Increasing number of training	Redefining existing jobs	Increasing expenditure on adv. or recruitment	Using new recruitment methods
Professional	45	98.11	54.72	64.15	56.6	24.53	54.72
Technician	85	100	78.57	59.09	74.68	31.17	55.84
Sales and clerk	24	96	48	44	48	24	48
Crafts and other	91	98.48	73.86	69.7	88.64	23.11	31.06
Total	100	98.91	73.55	62.86	78.26	27.17	69.32

About 98.91 percent of the enterprises noted that they would address the problem of skill shortage. About 73.55 percent of the firms will address this problem by increasing the salaryof the workers to attract more skilled labor. All reported firms think that they should increase the salary of the sales-related workers to hire skilled workers. About 63 percent of the firmsreported that they would increase the number of training for the workers, particularly the craft workers and machine operators and associate professionals and technicians. Interestingly, redefining jobs has also been agreed upon by about 78.26 percent of the firmsand they think it is particularly necessary for technical workers. A slightly less than three- fourth of the enterprises want to use new recruiting methods, particularly for the professionals and sales-related workers.

4.7 Level of Proficiency and Skill Gap

Table 15: Level of proficiency and skill gap of the workers

	No. of people employed	Level of proficiency of the workers (1-10 scale)	Skill gap (10 minus level of proficiency)
Manager	220	7.67	2.33
Professionals	126	7.18	2.82
Technician	1712	7.11	2.89
Sales and clerk	380	7.62	2.38
Crafts and other	6263	6.36	3.64
Total	8701	6.75	3.25

To understand the gap between the desired level and actual level of proficiency to perform ajob, we asked the respondent to scale the level of proficiency of the workers on a 1-10 scalewith a higher number signifying higher proficiency. The average level of proficiency is 6.75 for all workers. Interestingly, craft workers and machine operators have the lowest score –6.36, compared to other occupations. The level of proficiency is the highest for the managers(7.67), followed by the sales and clerks (7.62). The analysis indicates that the skill gap is moderate among the workers which is about 32.5 percent. The skill gap is the highest for thecrafts and plant workers which is about 36 percent.

4.8 Training of the workers

To better conceptualize the types of training, we divide all training received by the workers into five categories as following.

Table 16: Types of training with examples

	Types of training	Examples of training
1	Health and safety-related training	Basic training on health and safety
2	Task-specific training	Training on electronics, lathe machine and welding machine operation, modern moldingpractice, etc.
3	Other Training	Training on electric and mechanical engineering, CNC machine operation etc.

Table 17: Training received by the workers in the last 3 years.

Types of training	Total persons received trainingin 2019	Duration of the training(%)				Got leavefor training? (whole training)	Who conducted training? (%)		Certified? (%)
		< 1 week	1-2 weeks	3-4 weeks	1-3 months		External trainers in factory premise	External trainers outside factory premise	
Health and safety related training	310	80	0	20	0	100	50	50	20
Task specific training	3	33.33	0	66.67	0	100	0	100	20
Others	20	100	0		0	100	0	100	0
Total	333	68.75	0	31.25	0	100	37.5	62.5	18.75

Only 333 workers out of 8701 workers received training in the last three years, which is only 3.83 percent. All of the training's duration was less than a month, with less than a week training dominates constituting about 68.75 percent of all training received by the workers.Except for the training in new technology, the workers got to leave for the whole training. Aslightly less than two-third of the training is conducted outside of the factory premise and the rest on the factory premise. The average expenditure in training by the firms in the last3 years is only Taka 870. And only 18.75 percent of the training offered certificates.

4.9 Industry-TVET linkage

As shown in Table 18, the link between the enterprise and TVET is very weak. In the last 3years, only 11 firms reported having their workers sent to TVET for training. Interestingly,this number is higher for the smaller firms than the medium and large firms. 105 workers from small firms, 1 from medium firms and 9 from large firms were sent to TVET. The share of workers with TVET linkage is only 1.33 percent.

Table 18: Industry-TVET linkage

Size	No. of Obs.	Number of employees sent toTVET for training
Small	9	105

Size	No. of Obs.	Number of employees sent toTVET for training
Medium	1	1
Large	1	9
All	11	115

4.10 Automation and Jobs

We also discuss the extent of automation and its potential threat in displacing jobs (Table19). We asked to scale the extent of automation a particular occupation may experience inthe next 5 to 10 years on a 1-10 scale. On average, the score is 5.08. According to the respondents, the technician and associate professionals are under more threat than technology-related works. However, when it comes to the extent of job displacement due to automation, on average the score is highest for the professionals. About 22 percent of the firms think that workers need the training to embrace automation.

Table 19: Extent of automation and job displacement

	No. of firms reported that these jobs will besubject to 5 to 10years	To what extentthis occupation is subject to automation in next 5 to 10 years	Due to automation, what will be the extent of job displacement?	Extent of routine work	Do you have any planto train your workers to embrace automated technology?
		(1-10 scale)	(1-10 scale)	(1-10 scale)	(%)
Manager	0	N/A	N/A	N/A	N/A
Professionalls	3	5.00	5.00	4.00	0.00
Technician	34	5.12	4.31	3.79	30.95
Sales and clerk	4	4.50	4.75	2.75	50.00
Crafts and other	99	5.08	4.46	3.47	21.70
Total	99	5.08	4.45	3.50	21.70

4.11 Occupation-wise Demand Projection

We also collect information on the occupation wise projection of the workers in the next 5 to 10 years, both qualitatively and quantitatively. According to Table 20, about 3.13 percent of the firms think that there will not be any growth of jobs in the coming years. Whereas, about two-thirds believe that there will be moderate growth, driven by the growth of the managers (89.84 percent) and professionals (91.14 percent). Then we wanted to know the number of theworkers the firm is expected to have in 2023, 2025 and 2030. Compared to 2019, the respondents believe that the number of workers will increase by 39.56 percent, about 9.89 annual growth rate. In 2019-2025 period, expected growth of the firms in terms of the workersis about 78 percent, which is a 13 percent annual rate. By 2030, the expected growth of the total workers is 127.83 percent, with more than 11.6 percent annual growth. It appears that the longer-term outlook is better, as projected by the firms.

Table 20: Growth projection of the workers by occupations

	Total employed in 2019	Growth of the number of works in next 5 to 10 years				Percentage increase in 2023 relative to 2019	Percentage increase in 2025 relative to 2019	Percentage increase in 2030 relative to 2019
		No growth	Moderate growth	High growth	Very high growth			
Manager	227	7.03	89.84	3.13		33.92	80.18	146.26
Professionals	126	1.27	91.14	5.06	2.53	98.41	197.62	323.02
Technician	1692	2.97	71.75	24.91	0.37	44.62	83.63	128.84
Sales and clerk	386	4.17	71.67	22.5	1.67	66.58	131.61	204.15
Crafts and other	6214	2.42	60.97	35.16	1.45	35.52	70.61	118.18
Total	8645	3.13	69.41	26.32	1.15	39.56	77.99	127.83

Tables A8.1 and A8.2 depict occupation-wise projections of the workers in the next 5 to 10 years. From the tables, we can see that only 0.74 percent of the large firms think that therewill be no growth of jobs in the upcoming years, whereas the figure is significantly higher (5.37 percent) for the small firms. Large firms are more optimistic about the high growth (45.22 percent) of the existing jobs compared to the small firms (25.63 percent). The gap in percentage is higher for the 'crafts and other' workers and technicians. Although the large firms expect high growth of jobs, when it comes to prediction of the number of jobs, for the small firms the percentage increase is higher. From the table, it can be seen that the small firms predict almost double percentage increase for each point of time. This might be because most of the small firms have a low initial number of jobs. From table A8.3 we can see that the firms expect the highest growth in the managerial jobs followed by the professional jobs. It is also notable that the firms expect that the occupations which deal with sophisticated machinery are going to increase about 1.5 to 1.8 times.

CHAPTER 5: FINDINGS FROM WORKER SURVEYS

Table 21: Categorization of the workers

Name of occupations	BSCO Code	Definition	Number of workers	Examples for electrical and electronic sector
Managers	1	Managers plan, direct, coordinate and evaluate the overall activities of enterprises, governments and other organizations, or of organizational units within them, and formulate and review their policies, law, rules and regulations.	42	General Manager, Executive Director, Production Manager, Factory Manager etc.
Professionals	2	Professionals increase the existing stock of knowledge, apply scientific or artistic concepts and theories, systematically teach about the foregoing, or engage in any combination of these activities.	14	Electrical engineer, mechanical engineer, chemist, computer programmer, accountant, marketing specialist, etc.
Technicians and associate professionals	3	Technicians and associate professionals perform mostly technicians and related tasks connected with research and the application of scientific or artistic concepts and operational methods, and government or business regulations.	345	IT Technician Radiator Technician, Foreman, Delivery in charge, Site Engineer, etc.
Service and sales workers	5	Service and sales workers provide personal and protective services related to travel, housekeeping, catering, personal care, or protection against fire and unlawful acts, or demonstrate and sell goods in wholesale or retail shops and similar establishments, as well as at the stalls and on markets.	40	Salesman, Line supplier, Storekeeper, marketing representative etc.

Craft workers & plant operators	7+8	Craft and related trades workers apply specific knowledge and skills in the fields to construct and maintain buildings, form metal, erect metal structures, set machine tools, or make, fit, maintain and repair machinery, equipment or tools, carry out printing work to produce or process foodstuffs, textiles, or wooden, metal and other articles, including handicraft goods. Plant and machine operators and assemblers operate and monitor industrial and agricultural machinery and equipment on the spot or by remote control, drive and operate trains, motor vehicles and mobile machinery and equipment, or assemble products from	899	Setting mechanic, Mold fitter, Gas cutting operator, Welder, Denting machine operator, Shaper machine operator, Pipe bending operator, CNC machine operator, Painter, Casting machine operator, Power press operator, auto chain making machine operator, LED light fitter, Laminating machine operator, Battery plant operator, Farness Machine operator, Trimming machine operator etc.
		parts according to strict specifications and procedures.		
			1340	

5.1 Socioeconomic background of the workers

The average age of the managers is about 31 years and all of them are male. About 95 percent of the managers are Muslim. Their average monthly salary including all benefits is Taka 27929. However, their household income, which includes other earning members, is Taka 31,777. The professionals are slightly older than the managers – their average age is 33 years. All the professionals are male and about 79 percent are Muslim. Their monthly salary is significantly less than the managers - Taka 13500. And the monthly household income is Taka 27473. The average age of technicians and associate professionals is about 30. Their average monthly salary is Taka 17076 and their average household income is Taka 26536. Service and sales workers are relatively younger - the average age is about 27 years and more than three fourth of them are male. Their monthly salary is Taka 14720 and household income is Taka 27871. Craft workers and plant operators, who constitute the major share of the workers, are the youngest among all occupation groups – the average age is about 30 years and their monthly salary is as large as the professionals.

Table 22: Socio-economic and demographic background of the workers

Occupations	Obs.	Age (years)	Male (%)	Religion (%)		Monthly Personal Income	Monthly Household Income
				Muslim	Hindu	(BDT)	(BDT)
Managers	42	31.19	97.62	95.24	4.76	27929	34626
Professionals	14	33.21	100	78.57	21.43	13500	27473
Technician	345	29.52	91.59	94.78	4.35	17076	26536
Sales and clerk	40	26.73	77.5	90	5	14720	27871

Crafts and other	899	29.77	85.87	93.21	5.78	11773	19873
Full sample	1340	29.70	87.57	93.37	5.58	13750	22378

5.2 Educational Background of the Workers

Table 23: Educational background of the workers by occupations

Occupation Category	Average years of Schooling	Share of PSC/class 5 passed (%)	Share of JSC / class 8 passed (%)	Share of SSC passed (%)	Share of HSC passed(%)	Share of Diploma passed (%)	Share of Honors passed (%)	Share of master's passed (%)
Managers	10.74	90.48	78.57	64.29	52.38	26.19	16.67	2.38
Professionals	12.74	95.88	88.60	82.00	76.84	26.19	19.67	2.38
Technician	10.28	91.59	81.45	61.45	46.96	15.36	10.72	2.03
Sales and clerk	10.23	92.50	77.50	62.50	52.50	20.00	10.00	2.50
Crafts and other	7.76	75.08	57.40	34.82	23.36	5.67	5.56	1.11
Full sample	8.57	80.37	64.78	43.36	30.97	9.18	7.31	1.42

For all workers, the average level of education is only 8.57 years. About 80 percent of the workers have passed the PSC exams or studied beyond grade 5. About 65 percent of the workers have passed the JSC exams or have 8 years or more years of education. About 43 percent of the workers have passed SSC or equivalent examinations and about 31 percent have the higher secondary degree. Out of 1522 workers, only 7.31 percent have bachelor degrees and 1.42 percent have master's degrees.

The average level of education of the managers is only 10.74. Among them about two-thirdshave SSC degrees and higher. There are 7 managers (16.67%) with an honors degree and one with a Master's degree. So, the managers of the electronics sector are not the same as otherformal industries. One-third of the professionals have degrees beyond SSC. In the case of technicians and associate professionals, the average years of schooling is just above 10 years. About 47 percent of them have passed HSC with 15.36 percent diploma and about 11 percent with a bachelor degree. Service and sales workers are as educated as the technicians and associate professionals - their average years of education is 10.23 years. Among them, 20 percent are honors graduates and 10 percent have master's degrees. Craft workers and plant operators are comparatively less educated– average years of schooling is only about 7.76 years. Only 43 percent of them have passed the SSC examination. Less than one-third of them did go past grade HSC.

Table 24: Educational background of the workers: PSC examination/class 5 passed

Occupation Category	Obs.	Type of Exam (%)			Rural (%)	Type of the Institution (%)			Result
		Bengali Medium	TVET	Madrasa		Govt.	Private	NGO & Others	GPA
Managers	40	100			60	90	7.5	2.5	N/A
Professionals	7	85.71		14.29	71.43	57.14	42.86		N/A
Technician	332	96.39		3.6	80.97	84.64	11.75	3.61	3.77

Occupation Category	Obs.	Type of Exam (%)			Rural (%)	Type of the Institution (%)			Result
		Bengali Medium	TVET	Madrasa		Govt.	Private	NGO & Others	GPA
Sales and clerk	40	95		5	69.23	87.5	12.5		3.67
Crafts and other	657	96.5		3.5	81.55	86.45	11.72	1.83	3.67
Full sample	1,076	96.47		3.53	80.09	85.9	11.78	2.32	3.69

About 96 percent of the workers with grade 5 are from the Bengali stream and the rest are from the madrasa stream. About 80 percent of workers passed PSC/ grade 5 from the schools located in the rural areas. Public primary schools dominate largely - about 85.9 percent are from public schools.

Most of the workers were in Bengali medium schools at the primary level with some madrasa stream. About 3.5 percent of the craft and plant workers passed PSC/ equivalent under the madrasa board. Average GPA of the PSC examination is 3.69, with little differences between all groups except managers. The average GPA of the PSC exam was 3.77 for the managers. In short, the workers are largely from Bengali medium public schools and the craft workers& plant operators and sales & clerk workers have lower GPAs.

Table 25: Educational background of the workers: JSC examination/class 8 passed

Occupation Category	Obs.	Type of Exam (%)			Rural (%)	Type of the Institution (%)			Result
		Bengali Medium	TVET	Madrasa		Govt.	Private	NGO & Others	GPA
Managers	39	97.44	0	2.56	51.28	12.82	87.18		4.5
Professionals	6	83.33	0	16.67	33.33	16.67	83.33		4
Technician	300	89.67	0	10.33	75.67	5.67	93	1.33	4.02
Sales and clerk	38	81.58	0	18.42	63.16	8.11	91.89		3.80
Crafts and other	483	87.16	1.86	10.97	82.4	3.53	95.44	1.04	3.89
Full sample	866	88.24	1.04	10.73	77.51	4.97	93.99	1.04	3.93

Among the workers who took the JSC exam/ passed 8^{th} grade, 97 percent of them were fromBengali medium. The share of madrasa students at the JSC level is noteworthy. Only 77.51 percent of workers took JSC or equivalent exams from rural high schools as opposed to 80 percent for PSC or equivalent exams. Since most of the secondary schools are private, about94 percent passed JSC from private schools. In the case of results, we observe significant variations across occupation groups. Average GPAs for the managers and professionals are 4and 5 respectively. Interestingly, the service and sales workers had the lowest average GPA– which is 3.9. The average GPA of the craft workers and plant operators is 3.89, which is slightly higher than that of PSC. In short, the average GPA is higher for the workers who completed JSC than that of PSC.

Table 26: Educational background of the workers: SSC examination

Occupation Category	Obs.	Type of Exam (%)			Rural (%)	Type of the Institution (%)			Result			
		Bengali Medium	TVET	Madrasa		Govt.	Private	NGO & Others	1st Dev.	2nd Dev.	3rd Dev.	GPA
Managers	38	97.37		2.63	42.11	15.79	84.21		39.13	56.52	4.35	3.83
Professionals	5	80		20	20		100			100		4.00
Technician	242	87.19	0.41	12.4	73.14	5.37	93.39	1.24	8	92		3.94
Sales and clerk	35	80		20	63.89	8.57	91.43			100		4.09
Crafts and other	260	83.08	1.15	15.77	79.92	3.49	96.12	0.39	9.09	86.36	4.55	3.70
Full sample	580	85.54	0.69	13.77	73.15	5.35	93.96	0.69	17.81	79.45	2.74	3.84

43.36 percent of the workers passed the SSC examinations. Among them 85.54 percent arefrom Bengali medium, 13.77 percent from madrasa and the rest are from TVET. Of those who took the SSC examination before the GPA system was introduced, about 80 percent secured 2nd division. In the case of craft workers and plant operators, this figure is about 86percent. The average GPA of the Craft workers and plant operators is 3.70 which is less thanthe other occupation categories. Besides, only about half the craft and plant workers who passed PSC went on to pass the SSC examination.

Table 27: Educational background of the workers: HSC examination

Occupation Category	Obs	Type of Exam (%)			Rural (%)	Type of the Institution			Result			
		Bengali Med.	TVET	Madrasa		Govt.	Private	NGO & others	1st Dev.	2nd Dev.	3rd Dev.	GPA
Managers	25	100			8	36	64		14.29	64.29	21.43	4.43
Professionals	2	100			0		100					3.00
Technician	97	93.81	6.19		44.33	18.5	81.44			66.67	33.33	3.66
Sales and clerk	19	100			26.32	21.1	78.95			100		3.72
Crafts and other	124	85.48	1.6	12.9	44.35	24.2	75	0.81		100		3.41
Full sample	267	91.01	0.75	8.24	39.33	22.9	76.78	0.37	7.41	74.07	18.52	3.56

Around 31 percent of the workers have the HSC degree. Most of the workers are from Bengali medium (91 percent), with about 8 from the madrasa. As far as result is concerned before the GPA system, they obtained second division mostly, with 18.52 percent third division. All of the service workers, as well

as crafts workers, obtained 3rd division. The average GPA is 3.56. Except for Managers (4.43), the average GPA varies between 3.00 and 3.72 for otheroccupations.

Table 28: Educational background of the workers: Diploma Degree

Occupation Category	Obs.	Subject (%)			Duration of the course(%)			Type of the Institution (%)			Result			
		Sci.	Arts	Com.	Two years	Three years	Four years	Govt.	Pvt.	NGO & Others	1st Dev.	2nd Dev.	3rd Dev.	GPA
Managers	8	100				37.5	62.5	75	25		33.3	66.7		3.40
Professionals	2	100					100	100						3.00
Technician	91	98.9		1.09	2.17	3.26	94.57	38.89	57.7	3.33	71.4	14.3	14.3	3.37
Sales andclerk	17	100				5.88	94.12				37.5	37.5	25	3.29
Crafts and other	40	97.6		2.44		19.51	80.49	53.66	43.9	2.44				3.34
Full sample	158	98.8		1.24	1.24	9.32	89.44	49.06	47.8	3.15	22.2	55.6	22.2	3.35

Only 158 workers (9.18%) have diploma degree. Most of the diploma degree holders are from science backgrounds (98.76%). Among the workers with diploma degree, 89.44 percent have four-year diplomas, 9.32 percent have three-year diploma and 1.24 percent two-year diploma degree. The share of four-year diploma degree is the highest for the technician and associate professional workers (85 percent). On average, almost half of them received the degree from public institutions. In the older system of division, 22.22 percent received 1st division and 55.56 percent received 2nd division. The average GPA is 3.35 for all workers. The average GPA is the highest for the managers.

Table 29: Educational background of the workers: Bachelor Degree

Occupation Category	Obs.	Subject (%)			Duration of the course (%)			Type of the Institution (%)		Result			
		Sci.	Arts	Com.	Two years	Three years	Four years	Govt.	Pvt.	1st Dev.	2nd Dev.	3rd Dev.	GPA
Managers	21	0	100	0	23.81	19.05	57.14	71.43	28.57	7.69	69.23	23.08	3.38
Professionals		0		0									
Technician	36	0	100	0	5.56	44.44	50	27.78	72.22		85.71	14.29	3.24
Sales and clerk	7	0	100	0		14.29	85.71	42.86	57.14		100		3.20
Crafts and other	16	0	100	0	25	37.5	37.5	43.75	56.25		100		3.30
Full sample	80	0	100	0	13.58	34.57	51.85	43.21	56.79	3.57	82.14	14.29	3.28

Only 80 workers out of 1340 have a bachelor degree. All of these workers are from an arts background. Interestingly, the majority of them attended a four-year-long course. Among the workers with a bachelor

degree, 82.14 percent obtained second division and 15 percent,third division. The average GPA for all workers is 3.28, which varies from 3.20 to 3.38 across occupations.

Table 30: Educational background of the workers: Master's Degree

Occupation Category	Obs.	Subject (%)			Duration of the course (%)		Type of the Institution (%)		Result			
		Sci.	Arts	Com.	One year	Two years	Govt.	Private	1st Dev.	2nd Dev.	3rd Dev.	GPA
Managers	7	0	0	100	0	100	85.71	14.29	16.67	66.67	16.67	3
Professionals		0	0									
Technician	6	0	0	100	50	50	100			100		3
Sales and clerk	1	0	0	100		100	100					3
Crafts and other	2	0	0	100	50	50	100			100		4
Full sample	16	0	0	100	25	75	81.25	18.75	10	80	10	3.17

Only 16 workers in our sample of 1340 workers have master's degree. They are mostly froma commerce background. Most of them got second division in the old grading system. The average GPA is 3.17.

5.3 Technical and Vocational Training of the Workers

Table 31: Technical and vocational training of the workers

Occupation Category	Obs.	Ever attended vocational Training? (%)	Ever attended vocational Training not arranged by the employers? (%)	Ever attended vocational Training arranged by employers? (%)
Managers	42	9.52	7.14	11.9
Professionals	14	7.14	7.14	
Technician	345	7.54	9.57	2.9
Sales and clerk	40	7.5	10	2.5
Crafts and other	899	6.34	8.34	0.89
Full sample	1340	6.78	8.64	1.79

Only 6.78% have ever attended any vocational training. Among the workers, 8.64 percent ofworkers attended training not arranged by the employers and 1.79 percent of workers attended training arranged by the employers. Only 6.34 percent of the craft and plant workers and 7.54 percent of the technicians and associate professionals received training. These training are mostly arranged by themselves or NGOs or the government.

Table 32: Technical and vocational of the workers not arranged by employers: Managers

Managers	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Expenditure borne by (%)			Satisfaction
Category of Training		< 1 w	1-2 w	3-4 w	1-3 mon.	4-6 mon.	>6 mon.			Self	Govt.	NGO & Others	Scale of 1 to 10
Engineering &Technical	2			50			50	100	100	100			8
Others	1			100				100	100	100			8
Full sample	3			66.67		33.33		100	100	100			8

Note: w= week

Now we explore the type of training received by the managers which were not arranged by the employers. We categorize all training into four groups – engineering and technical, agriculture-related, manufacturing and crafts, service and creative courses. Engineering & Technical courses span from 3-4 weeks to 6 months. All the training are certified and they are certified by BTEB. The cost is borne mostly by themselves. The satisfaction level of all the courses are equal and above 8 on a scale of 1 to 10.

Table 33: Technical and vocational of the workers not arranged by employers: Professionals

Professionals	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Expenditure borne by (%)			Satisfaction
Category ofTraining		< 1 week	1-2 weeks	3-4 weeks	1-3 mon.	4-6 mon.	>6 mon.			Self	Govt.	NGO & Others	Scale of 1 to 10
Others	1				100			100	100		100		8
Full sample	1				100			100	100		100		8

Only 1 professional received training not arranged by the employers. The training was BTEB certified. The cost of training was borne by the government. The satisfaction level is8.

Table 34: Technical and vocational of the workers not arranged by employers: Techniciansand associate professionals

Technician	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Expenditure borne by (%)			Satisfaction
Category of Training	3	< 1 week	1-2 week	3-4 week	1-3 mon.	4-6 mon.	>6 mon.			Self	Govt.	NGO & Other	Scale of 1 to 10
Engineering & Technical	23	8.7	13.04	17.39	34.78	26.09		91.3	82.61	52.1	39.13	8.7	7.39
Manufactu	1				100			100	100	100			8

Technician	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Expenditure borne by (%)			Satisfaction
Category of Training	3	< 1 week	1-2 week	3-4 week	1-3 mon.	4-6 mon.	>6 mon.			Self	Govt.	NGO & Other	Scale of 1 to 10
re & Crafts													
Others	6			33.33	16.67	33.33	16.7	100	83.33	33.3	16.67	50	6
Full sample	30	6.06	18.18	18.18	36.36	21.21	6.07	93.94	81.82	51.5	33.33	15.15	7.34

30 technicians and associate professionals received training not arranged by the employers. 64 percent courses were more than one month long. About 94 percent of the courses are certified and half of the courses are self-financed. Most of the engineering and technical courses were 3-4 weeks long (46 percent). These courses were largely certified (94 percent) and certified by BTEB (82 percent). The cost of these expenditures was borne by themselves (51.52 percent), NGOs (15.15 percent) and the government (33.33 percent). The training on engineering are of different length, from less than a week to 4-6 months. These courses were largely sponsored by themselves and the government. Technicians and the associate professionals received 'other' courses also which are longer in duration. The workers of this occupational group are not very satisfied with such courses as they scaled technical courses6 on a 1-10 scale.

Table 35: Technical and vocational of the workers not arranged by employers: Service andsales workers

Sales and Service	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Expenditure borneby (%)			Satisfaction
Category of Training		< 1 week	1-2 week	3-4 week	1-3 mon.	4-6 mon.	>6 mon.			Self	Govt.	NGO & Others	Scale of 1 to 10
Engineering &Technical	2				50	50		100	100		50	50	7.5
Manufacture &Crafts	1						100	100	100	100			8
Others	1				100			100	100		50	50	8
Full sample	4				50	25	25	100	100		50	50	7.75

Service and sales-related workers received 2 engineering and technical training which were1- 3 and 4-6 months long and BTEB certified. These were financed by the government and NGOs. Besides, these workers received manufacture and other training which were also BTEB certified. Workers from these occupations seem to be satisfied with the courses theyreceived as they scaled the courses on average 7.75 on a 1-10 scale.

Table 36: Technical and vocational of the workers not arranged by employers: Craftworkers and plant operators

Sales and Service	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Expenditure borne by (%)			Satisfaction
Category of Training		< 1 week	1-2 week	3-4 week	1-3 mon.	4-6 mon.	>6 mon.			Self	Govt.	NGO & Others	Scale of 1 to 10
Engineering &Technical	48	2.08		4.17	29.17	35.4	29.2	95.83	70.83	39.5	35.4	25	7.4
Manufacture &Crafts	9	22.2		22.22	44.44	11.1		100	88.89	66.6	22.2	11.11	8.0
Service and creative courses	2				100			100	50	50		50	7.5
Others	15	6.67	6.67		33.33	26.6	26.6	100	99.88	26.6	26.6	46.67	7.3
Full sample	74	5.33	1.33	5.33	32	32	24	97.33	70.67	40	32	28	7.45

74 craft workers and plant operators received four types of training not arranged by the employers. 48 workers received engineering and technical training which were of different duration, from less than a week to more than 6 months. The majority of such courses were 4-6 months long. About 96 percent of such courses were certified and 71 percent were certified by BTEB. These courses were largely financed by themselves (39.58 percent), followed by the government (35.42 percent) and NGO (25 percent). 9 craft and plant workers took courses on manufacturing and crafts which are also of varied length. About 44 percent of them are of 1-3 months. For all courses, about 71 percent of them are BTEB certified and most of them are self-financed. The workers seem to be satisfied with such courses and their satisfaction level varies little across the types of training.

5.4 Training Need Assessment

Table 37: Need for training and threat of automation.

Occupation Category	Training needed to increase your skill? (%)		Training needed for carrier progression? (%)		Training needed to adapt with the technological change?(%)		Opinion on extent of Automation replacing yourjob (scale of 1 to10)
	Yes	No	Yes	No	Yes	No	Mean
Managers	95.24	4.76	95.24	4.76	97.62	2.38	4.45
Professionals	71.43	28.57	85.71	14.29	85.71	14.29	4.21
Technician	90.14	9.86	95.36	4.64	91.01	8.99	4.12
Sales and clerk	92.5	7.5	95	5	95	5	4.15
Crafts and other	85.87	14.13	91.66	8.34	89.99	10.01	4.34
Full sample	87.19	12.81	92.63	7.37	90.47	9.53	4.28

Almost all workers of all occupation categories opined that they needed training for skill up-gradation. However, not all of them agreed that they needed training for career progression. This may indicate that there may not be a one-to-one correlation between career progression and skill level. Interestingly, about 46 percent of the technicians and associate professionals and 38 percent of craft and plant workers noted that they did not need training to adapt with the technological changes. This may indicate the stagnation of the technological changes in the electronics sector. The workers in this sector don't think that automation will take their jobs away. We asked them to scale the threat of automation in replacing their jobs; the mean value is only 4.4 and this does not vary across occupations.

When asked about what types of training they need to upgrade their skills or their career progression, they hardly could spell out the exact name of the training. However, they reported the fields where the felt they needed training. The following Table 37(a) documents the product wise list of the fields where further training is needed.

Table 38: Name of training/fields of training needed by product lines

Sl. No.	Name of the products	Name of the training/fields of training
1	TV	Basics of electrical, circuits, wiring, programming, measurement, advanced injection machine, modern stamping machine, operation of modern machines, IT
2	Refrigerator	Basics of electrical, mechanical, circuits, fridge fitting, wiring, cabinet framing, parts wielding, SIM wielding, advanced training on painting, quality control, safety measures
3	Washing machine	Basics of electrical, mechanical, circuits, wiring, assembling, advanced training on painting, quality control
4	Air Conditioner	Basics of electrical, circuits, PLC program logic control, AC fitting, AC leak checking, modern machine operation, problem shootings, advanced wielding, advanced training on painting, quality control
5	Compressor	Basic training on electrical, mechanical, CNC programming, advanced measurement, micron technology, IT, safety measures
7	Blender/rice cooker	Computer design, programming, measurement, quality control, basic electrical, rice cooker fitting, modern packaging machine
8	Battery/ generator	Battery potting, resin, soldering, fitting, battery cell, measurement of chemicals, acid filling, coiling, quality control, all steps of producing generators
9	Transformer	Trunk fitting, LT-HT switch gear, PFI panel, transformer panel, control switch, sub-station, volt switch, tank setting, coiling, advanced wielding, fitting, core cutting, quality control, safety measures
10	Light/fan	Basic electronics, coil fitting, advanced lathe machine, qualitycontrol

5.5 Self-assessment of Skill

Table 39: Self-assessed skill and demand for skills

Occupation category	Level of self-assessed proficiency (scale of 1 to 10)	Formal education helps in performance (scale of 1 to 10)	Experience helps in performance (scale of 1 to 10)	Assessment of skill demand (in job) (scale of 1 to 10)	Assessment of skill demand (outside job)(scale of 1 to 10)	How hard it would be getting a betterjob in case of termination? (Scale of 1 to 10)
Managers	7.76	6.67	7.17	7.38	6.98	5.31
Professionals	7.43	4.36	6.71	7.36	6.86	5.43
Technician	7.41	6.23	7.33	7.35	6.92	5.34
Sales and clerk	7.48	6.50	7.40	7.48	7.00	5.25
Crafts and other	7.01	4.80	6.97	7.10	6.65	5.29
Total	7.15	5.27	7.08	7.18	6.74	5.30

We asked the workers to assess several issues related to their skill and skill demand on a 1-10 scale. In the case of self-assessed proficiency, all of them scaled themselves above 7. The next question was if formal education helps for better performance. Interestingly, managers and service and sales workers think formal education is important as their average score were 6.5 or above. The floor workers such as craft workers and plant operators' average points were only 4.80 – they seem to disagree that formal education helps in performance in their jobs. The points given by the professionals are also lower (4.36) relative to non-technical occupations. The next two questions deal with the skill demand in job and outside job. Their scaling seems to indicate sales and clerks and technicians are in higher demand both in job and outside jobs. Technical persons seem to have better market demand and this is also manifested in the last question where we asked to scale the extent of difficulties they would face if they lose their jobs. Sales and clerk and craft workers reported lower scores on thescale than other occupations.

5.6 Extent of Formality

Table 40: Extent of formality

Occupation category	Type of contract (%)		Weekly paid leave (%)			Paid leave: Weekends	Paid sick leaves	Paid casual leaves
	Written	Oral	One day	Two days	More than 2 days	(%)	(%)	(%)
Managers	64.29	35.71	100			100	100	78.57
Professionals	42.86	57.14	100			100	100	85.71
Technician	62.61	37.39	100			100	100	82.61
Sales and clerk	70	30	100			100	100	70
Crafts andother	30.26	69.74	99.89	0.11		100	100	74.64
Full sample	40.88	59.12	99.93	0.07		100	100	76.84

We examine several aspects of the formality of employment in the electronics sector. 70 percent of the

sales and clerks have written contracts - the highest among the occupation categories. Managers come next – about 64.29 percent of them reported having written contracts. Among the technicians, only 62.61 percent have written contracts. As expected, the floor workers –craft workers and plant operators are the least formal occupations as far as type contract is concerned. Only 30.26 percent of craft and plant workers are formally employed with written contracts. All of the workers reported that they enjoy one day ofweekly paid leaves and the privilege to have paid sick leaves. The share of paid causal leavesis also not low given the fact that the incidence of the written contract is low. This varies 70 percent and 85.71%.

Table 41: Extent of formality (Continued)

Occupation category	Paid Maternity/ Paternity leave	Receive pension?	Have life insurance?	Have health insurance?	Have loan facility?
	(%)	(%)	(%)	(%)	(%)
Managers	57.14	2.38	2.38	0	71.43
Professionals	78.57	0	0	0	50
Technicians	61.74	5.51	0.58	4.64	73.91
Sales and clerk	67.5	2.5	2.5	2.5	87.5
Crafts and other	62.85	3.56	0.22	3.11	58.29
Full sample	62.55	3.95	0.45	3.35	63.37

In the case of female workers, there are paid maternity leaves. On average 62.55 percent of the workers receives this. There is hardly any pension, life insurance or health insurance provided by employers. However, there are some informal loan facilities for the workers – the owners often extend loans to the workers in time of their needs. About 58.29 percent of thecraft workers and plant operators reported that they can borrow informally from the owners. This figure is 71.43 percent and 73.91 percent for mangers and technicians and associate professionals respectively.

5.7 Satisfaction Level of the Workers

Overall satisfaction level with the jobs is higher for the managers than other occupations. These is craft and plant operators and this comes largely from the inadequate salary. Two- thirds of the sales workers disagree, though slightly, that they are paid adequately. However,about half of the managers and technicians and associate professionals think that they are adequately paid. Crafts and plant operators are not satisfied with the job prospects - about 58 percent of them opined that they are not satisfied. More than half of the professionals hasthe same opinion. A large share of the workers across occupations mentioned that their supervisors are knowledgeable about their jobs.

Table 42: Satisfaction of the workers

Occupation	Overall Satisfaction	I am paid adequately (%)					I am satisfied with my job prospect (%)					My supervisor is knowledgeable of my job				
	Mean (scale of 1 to 10)	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree
Managers	6.74		45.24	2.38	47.62	4.76	2.38	26.19		57.14	14.29				2.38	97.62
Professionals	6.21		71.43		28.57			57.14		35.71	7.14				21.43	78.57
Technician	6.58	4.35	40.58	2.03	48.99	4.06	4.64	31.3	5.22	45.8	13.04		0.58	1.74	23.48	74.2
Sales and clerk	6.58		55	2.5	30	12.5	2.5	20		65	12.5				15	85
Crafts and other	6.19	11.23	49.94	2.45	33.37	3	9.23	48.72	4.23	33.37	4.45	0.11	0.89	1.11	25.58	72.3
Full sample	6.32	8.64	47.73	2.31	37.75	3.57	7.52	42.74	4.24	38.27	7.22	0.07	0.74	1.19	23.98	74.01

Table 43: Satisfaction of the workers (continued)

	I am satisfied with my workplace safety (%)					My employers offer me training opportunities				
Occupation	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree
Managers		7.14		33.33	59.52	2.38	33.33		59.52	4.76
Professionals		7.14		64.29	28.57		42.86		50	7.14
Technician	1.16	4.06	1.16	32.75	60.87	5.8	39.13	2.9	49.57	2.61
Sales and clerk				10	90		27.5		70	2.5
Crafts and other	1.45	10.12	2.11	43.27	43.05	10.34	45.49	3	37.26	3.89
Full sample	1.27	8.12	1.71	39.54	49.37	8.49	43.04	2.76	42.14	3.57

45 Interestingly, there is not much complaint about workplace safety. About 80 percent of the workers are satisfied with workplace safety. We also asked if the workers think that they are offered training opportunities. More than half of the craft and plant workers tend to disagree. The technicians and associate professionals are equally divided on this issue. About 45 percent disagree that they are offered training opportunities and about 52 percent think otherwise.

5.8 Soft Skill of the Workers

As we argue in our conceptual note that soft skills are also important for the productivity of the firms. There are 15 questions and 3 questions for each trait, following the standard measures https://openpsychometrics.org/printable/big-five-personality-test.pdf. The questions are scrambled so that the workers don't understand what type of non-cognitive skill we are trying to elicit.

Extroversion

Extroversion is the personality trait of seeking fulfilment from sources outside the self or in the community. High scorers tend to be very social while low scorers prefer to work on their projects alone. The mean value of extroversion for all workers is 9.02 out of 15. Surprisingly, the craft and plant workers score the highest (9.10) and sales workers the lowest (8.825).

Agreeableness

Agreeableness reflects how much individuals adjust their behavior to suit others. High scorers are typically polite and like people. All workers are more or less agreeable as the average score is 11.44 out of 15. There is not much difference across the occupations. Sales and Clerks and Mangers tend to be slightly more agreeable than others.

Conscientiousness

Conscientiousness is the personality trait of being honest and hardworking. High scorers tend to follow rules and prefer clean homes. Low scorers may be messy and cheat others. We also observe a very high level of conscientiousness as the average score is 12.53 out of 15. Professionals and managers report slightly higher conscientiousness – about 13.9.

Neuroticism

Neuroticism is the personality trait of being emotional. High scorers tend to have high emotional reactions to stress. They may perceive situations as threatening and be more likely to feel moody, depressed, angry, anxious, and experience mood swings. Low scorers tend to be more emotionally stable and less reactive to stress. Neuroticism is found to be very low for all workers - the average score is 4.45. This is slightly higher for the sales workers and clerks.

Openness to Experience

Openness to Experience is the personality trait of seeking new experiences and intellectual pursuits. High scores may daydream a lot (enjoy thinking about new and different things). Low scorers tend to be very down to earth (more of a 'hear and now' thinker). Consequently, it is thought that people with higher scores might be more creative, flexible, curious, and

adventurous, whereas people with lower scores might tend to enjoy routines, predictability, and structure. Openness to experience is moderate – the mean score is 6.72 out of 10. This score is the highest for the technician and associate professionals (6.83) and the lowest forthe craft and plant workers (6.68).

Table 44: Five big personality tests

Occupations	Extroversion	Agreeableness	Conscientiousness	Neuroticism	Openness to Experience
	(1-15)	(1-15)	(1-15)	(1-15)	(1-10)
Managers	8.83	12.05	13.29	3.95	6.74
Professionals	8.86	11.79	13.86	3.93	6.71
Technician	8.835	11.38	12.38	4.50	6.83
Sales and clerk	8.825	12.45	12.80	4.60	6.78
Crafts and other	9.10	11.38	12.52	4.45	6.68
Full sample	9.02	11.44	12.53	4.45	6.72

CHAPTER 6: IMPACT OF-19 ON ENTERPRISES AND WORKERS ANDRECOVERY

6.1 Impact on the enterprise

Table 45: Impact on the enterprises

Period: 1 January 2020 – 31 March 2020				
	Large	Medium	Small	Full sample
No. enterprises	34	32	34	100
Employment	7004	1078	604	8686
Output per enterprise (billion)	11.5	0.0229	0.0204	11.54
Period: 1 April 2020- 30 June 2020				
No. enterprises	34	31	35	100
Employment	6675	971	590	8236
Output per enterprise (billion)	0.23	0.01	0.01	0.24
Period: 1 July 2020 – 30 September 2020				
No. enterprises	34	29	37	100
Employment	6679	908	611	8198
Output per enterprise (billion)	1.07	0.0179	0.0136	1.1015

To capture the impact of COVID-19 in 2000, we collect information for three quarters: January-March, April-June and July-September. Note that the first COVID-19 case was detected in early March and the spread of the infection was very little in March. Hence, we can use the first quarter as the pre-covid period. Compared to this pre-covid period, total output per enterprise dropped drastically from 11.54 billion Taka to 0.24 billion Taka in thefollowing quarter of April-June. The reduction is larger for the large firms compared to the small and medium ones. However, the reduction in employment is not as large as the reduction in output. Most of the firms retained their employees in the time of lockdown andsubsequent months. Large firms shredded about 4.7 percent of the employees while the medium and small firms' number of employees shrunk by 11 percent and 2.3 percent respectively. Overall, the firms were downsized by 5.62 percent in April-June 2020 compared to the past quarter.

However, data on the third quarter – July-September 2020 shows that the reduction in the size of the firms was temporary. The small and medium firms bounced back very strongly inthe third quarter compared to the pre-covid period. However, a similar pattern could not beseen in case of large firms. Output per enterprise for the large firms was only 1.07 billion Taka which is 10.43 billion taka short of the pre-covid period. The recovery of the medium and small size firms was noteworthy. Recovery of employment is also slower for the medium firms – still operating with the workers which is about 18.7 percent lower compared to thepre-covid period. However, this figure is surprisingly optimistic in case of small firms, employment grew 1.16 percent compared to the pre-covid period for these firms.

6.2 Impact on the Workers

To capture the impact of COVID-19 on the workers, we collect monthly data from January toSeptember retrospectively. This allows us to examine the variations in several indicators such as status of employment, salary, household income, loan, whether returned home, economic hardship, household expenditure, and level of anxiety. These indicators are also expected to vary by occupation. So, we report the monthly value of all indicators for all fiveoccupations separately.

Table 46: Impact of COVID-19 and monthly indicators (Managers)

Managers	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
January	100			26785.71	34476.19		100		3.36	2.07
February	100			26785.71	34476.19		100		3.33	3.60
March	57.14	42.86		26785.71	34476.19		100		4.17	6.81
April	66.67	33.33		15183.33	22635.71	2.38	97.62	28.57	5.43	8.17
May	19.05	42.86	38.1	21726.19	28940.48	4.76	95.24	35.71	5.48	8.19
June	57.14	9.52	33.33	17809.52	25500	4.76	95.24	16.67	5.81	7.83
July	88.1	11.9		30911.9	38126.19		100		5.36	7.19
August	100			27892.86	35583.33		100		5.38	6.52
September	97.62	2.38		26785.93	34476.19		100		5.33	6.31

Note: In the case of the workers who returned home, the category of "not applicable" can be calculated residually.

Table 45 is for the managers for six indicators. We use January and February data as our benchmark – pre-covid months. Consider employment first. We observe a 42.86 percent drop in employment of managers in March 2020. We witness the largest drop in employment during May. About 80% of the managers were either partially employed or not employed atall. During July about 88 percent retained their employment. The workers were almost fullyemployed again in August and September.

The trend in salary followed the paths of employment. Monthly salary dropped by about 43 percent in April and then slowly picked up to reach the pre-covid period in July. We observea similar story for the household income. In April 2.38 percent of the workers borrowed moneyand this figure shot up to 4.76 percent in June. About 29 percent of the managers returned to villages in April and 36 percent in May. All the managers have returned to work when the situation tended to normalize in August.

Now consider economic hardship and degree of anxiety of the managers. We asked the managers to scale the economic hardship on a 1-10 scale. The score was about 3.36 in the pre- covid months and increased to as high as 5.81 in May. The score then decreased gradually toreach 5.33 in September. It is important to note that though the degree of economic hardshipreduced from the lockdown months, it is still above the pre-covid period. We then asked the managers to score the degree of anxiety on a 1-10 scale. We observe a similar trend of economic hardship – through the degree of anxiety reduced in September, the score was stillvery high (6.31) compared to the pre-covid months (2.07).

Table 47: Impact of COVID-19 and monthly indicators (Professionals)

Professionals	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
January	100			13357.14	26285.71	7.14	92.86		4.21	1.71
February	100			13357.14	26285.71		100		4.21	3.29

Professionals	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
March	35.71	64.29		13357.14	26285.71		100		4.71	7.36
April	21.43	35.71	42.86	9214.286	26285.71	21.43	78.57	35.71	5.86	8.93
May	28.57	35.71	35.71	13707.14	26778.57	28.57	71.43	21.43	5.71	9.00
June	92.86	7.14		12857.14	25785.71		100		5.79	8.14
July	92.86	7.14		18707.14	31278.57		100		5.29	7.43
August	100			13785.71	27107.14		100		5.64	6.71
September	100			13357.14	26285.71		100		5.50	6.50

Note: In the case of returned home, the category of "not applicable" can be calculatedresidually.

The professionals seemed to be affected significantly by the pandemic (Table 46). The employment dropped from 100 percent in March to 35 percent and it plummeted as low as 21.43 percent in April. They regained their employment in June and in August they were fully employed. We observe a slight reduction in salary and household income in April only.Incidence of borrowing occurred in April and May. During these two months, they also wentto villages. It is interesting to note that though the drop in salary is very little compared to the managers, the degree of anxiety is reported to be higher. Economic hardship and anxietyboth increased in the month of lockdowns but did not drop much since then up to September.

Table 48: Impact of COVID-19 and monthly indicators (Technicians and AssociateProfessionals)

Technicians and Associate Professionals	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
January	100			16619.65	25291.24	0.29	99.71		4.04	2.04
February	100			16619.65	25068.92		100		4.05	3.62
March	76.23	23.77		16559.79	25204.43	0.29	99.71	0.29	4.79	7.11
April	17.97	66.67	15.36	12422.26	22499.65	2.61	97.39	23.77	5.94	8.31
May	26.96	54.2	18.84	15501.11	22691.32	12.46	87.54	25.8	6.01	8.38
June	62.9	18.84	18.26	13361.97	20870.37	6.67	93.33	10.72	6.02	7.85
July	90.33	0.58	8.99	19486.32	27531.83	2.03	97.97	2.61	5.58	7.18
August	98.55	0.87	0.58	18796.75	28145.18		100		5.61	6.47
September	98.84	0.58	0.58	16418.78	24074.28		100		5.53	6.17

Note: In the case of returned home, the category of "not applicable" can be calculated residually.

Now consider technicians and associate professionals (Table 47). Though employment fully recovered by September to the pre-covid level, it dropped to17.97 percent in April and 26.96 percent in May. A large share of the technicians and associate professionals were partially employed during these two months.

These workers saw about 25 percent reduction of salaryin April which gradually increased to the pre-covid level in September. The incidence of taking loans also increased in the lockdown period and then reduced to the pre-covid level in August. About 25.8 percent returned to villages in May. Economic hardship and anxiety shot up in these lockdown months and anxiety was still above the pre-covid level in August-September by a large margin.

Table 49: Impact of COVID-19 and monthly indicators (Sales and Service workers)

Sales and Service workers	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
January	100			14095	26082.5		100		3.48	1.85
February	100			14095	26095		100		3.53	3.6
March	90	10		14292.5	26227.5		100		4.18	7.475
April	60	27.5	12.5	12932.5	24293.75		100	7.5	5.30	8.725
May	60	22.5	17.5	14215	26265	3	97	12.5	5.40	8.525
June	70	7.5	22.5	11045	26265	3	97	15	5.45	8
July	87.5	12.5		17140	33813.75	10	90	7.5	5.23	7.3
August	100			15420	27307.5		100		5.25	6.575
September	100			14095	26045		100		5.05	6.125

Now consider sales-related workers (Table 48). About two-thirds of the sales-related workers were not fully employed in April, including 12.5 percent of out-of-work workers. Salary alsoreduced substantially by 10 percent and gradually increased, though not to the level of pre-covid.. About 15 percent of the workers returned home in June and May and they all returned in August. The score of economic hardship is the highest in June, unlike other professions. The score of the degree of anxiety is the highest in April and never decreased to the pre- COVID level in September.

Table 50: Impact of COVID-19 and monthly indicators (Craft workers & plant operators)

Craft workers & plant operators	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
January	100			11393.85	20111.81	0.11	99.89		4.359	2.01
February	99.89	0.11		11401.41	19501.47	0.22	99.78		4.386	3.44
March	73.75	26.25		11483.06	19459.31	0.33	99.67	0.11	5.010	7.21
April	11.35	56.51	32.15	6645.905	13647.46	8.57	91.43	22.47	6.459	8.49
May	27.47	46.27	26.25	9650.572	16982.94	13.79	86.21	25.7	6.273	8.55
June	61.07	18.35	20.58	8858.444	16491.54	10.79	89.21	14.24	6.269	7.91

Craft workers & plant operators	Employed (%)			Salary	HH Income	Loan (%)		Returned Home (%)	Economic Hardship	Anxiety
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Yes	(1-10) scale	(1-10) scale
July	90.53	0.22	9.24	12718.65	20738.28	1.78	98.22	3.67	5.854	7.22
August	95.88	1.45	2.67	12637.4	20766.26		100	1.45	5.810	6.48
September	95.88	1.45	2.67	11053.69	18772.99	0.22	99.78	1.11	5.793	6.16

The monthly indicators for the craft and plant workers are presented in Table 49. Among the occupations, these workers experienced a large drop of full employment in April – about 88percent. About 57 percent were partially employed and 32 percent did not have any work inApril. The situation improved drastically from June and reached almost pre-covid level in August. Salary of the workers almost halved in April and then gradually increased. About 14percent took a loan in May. More than 23 percent of the craft and plant workers went back to villages during lockdown months. Still a small fraction of the workers did not return to work in September. The score of economic hardship remained above 7 from April to June and then came down, though remained above the pre-covid level. The increase in anxiety in March culminated in May and remained as high as 6.16 till September.

CHAPTER 7: CASE STUDY: WALTON

7.1 Introduction

Walton is now the market leader of consumer electronics in Bangladesh, which started its journey as a manufacturer in 2006. This agglomerate also manufactures and assembles smart phones, laptops, elevators, compressors and cables. Walton holds about 75 percent of market share of refrigerators, 50 percent of TVs and 20 percent of ACs. The company exports their products in 40 countries. According to the senior management of Walton, theirvalue addition is more than 50 percent.

The agglomerate employs more than 30 thousand workers including engineers, managers,technicians, and floor workers. About 700 graduate engineers work for the Walton.

Their model of technology transfer is interesting. When the company ventures into a new product, they tend to purchase a running factory abroad. For example, in the case of refrigerator, the company bought a running factory in Thailand. They bought a compressor factory from Austria. After the purchase, when the factory is still running, a group of engineers are sent abroad to learn the whole process of production. These engineers, with the help of the foreign partners, dismantle the whole factory and bring the factory in parts to Bangladesh. They then put the factory back into its original shape.

The group of trained engineers play the critical role in technology and knowledge transfer in the country. They generally end up heading a number of sections needed to manufacturethe products. They are also responsible to train others in the factory.

7.2 Training

Walton does not rely on market for the skilled labor. For example, in the case of engineers, they hire fresh graduates and train them on the factory floors. Most of the technical training are done on the factory floor as it allows hands-on training. However, Walton hasa training centers on its own. It runs a large number of training through this training center.

Table 51: List of training run by the training center

Type of training	Name of training
Orientation Training	Organization & Job Motivation
	HR Policy
	Admin Policy
	Health & Safety
HR Training	Working Hours, Compensation & Benefit Training
	Worker Rights and Responsibility Refresher Training
	Policy Related Training
	Office Etiquette & Service Behavior
	Leadership Development
	Labor Law Training
	Foundation Training
	Other Official & Inter-personal need basis Training
Admin & Legal Related Training	Anti-harassment (Sexual) Training
	Anti-Corruption and Anti-bribery
	Disciplinary Practice & Procedure with Grievance
	Force Labor Training
	Fire Fighter Training

Fire Safety Training	Emergency Preparedness Awareness Training
	Fire Drill (D&N)
Medical Related Training	First Aider Training
	HIV & AIDS Awareness Training
	Trauma & Serious illness Awareness Training
	Transmitted & Non-transmitted Diseases Awareness
	Working Mother & Children Health Care Awareness Training
EHS Related Training	Risk Assessment & Injury Analysis Awareness
	5-S Practice in Workplace
	Chemical Safety Handling & MSDS Training
	Occupational Health & Safety (PPE) Training
	Wastage Control & Housekeeping Training
	Environment Health & Safety Training
	Mid-Level Management Training
	BSCI COC & Buyer COC Awareness Training
	Ergonomics Awareness Training
Technical Training	Electrical Safety Training
	Welder's Corrective Action
	WIP monitoring
	6S, scoring & SMART goals
	Kaizen in Details
	Production Costing
	Visual Management
	SWOT Analysis
	OEE, Six Big Loss
	Process Capability
	Google office software solutions
	Standardized work
	Inventory Management System
	Pull System, Kanban, Kanban Card
	Material Handling & Transfer System
	In-house Technology of Mockup manufacturing
	BOM Operation & MRP Declaration Process
	Supply chain Management Process
	Parameters for Mold/ Die Manufacturing
	Material Inspection Process
	General SOP
	Time and Motion Study
	Product effect from Chemical Properties
	Product effect from Metallurgical properties
	Control test and Reliability Test Design
	Process to develop Standard
	CB, EMC, RoHS, Product Mark
	PDCA Problem Solving
	IMS (Integrated Management System)

	Advanced training on MS Excel
	Professional Diptrace learning and MikroC Programming
	Linux programming
	CCNA, Networking
	Artificial Intelligence (AI)
	Data Science/Data Analytics
Various	Participation Committee Training
	Training of Trainer
	Workplace Wellbeing Management
	Project Management
	Engineering Measurement
	Team Management
	DFSS (Design for Six Sigma)

CHAPTER 8: RECOMMENDATIONS

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

8.1 General Recommendations for Skill Development

i. Broader Definition of Skill is Required

As we know there are various types of skills such as cognitive, non-cognitive or soft, and technical skills. These three are the important determinants of the individual earnings. Moreover, the distinction between transferable (general) and non-transferable (occupationor task specific) skills helps justify government interventions. Understanding and recognition of the importance of different types of skills is central to designing an overarching implementable framework for skill development. It is important to note that NSDP 2011 defines Skills development "as the full range of formal and non-formal vocational, technical and skills based education and training for employment and or self-employment" (NSDP, 2011). That is, the definition is very narrow and focuses only on the technical skill, ignoring the cognitive and soft parts of it. It is also empirically established that the level of technical skill acquisition critically hinges on the level of cognitive abilities.Therefore, it is essential to define skills with a larger scope by including its all aspects.

ii. Skill Acquisition is a Life Long Learning

The concept of lifelong learning entails the creation of opportunity for learning and skill acquisition at any age of life. Being a central theme of SDG4, it also helps guide the skill development strategy of a country. Any person at any age should be able to learn somethingnew and it is the responsibility of the government to create the enabling environment for it.The education ecosystem that supports the lifelong learning promotes early childhood development, adult literacy and training, no entry barrier to general education and TVET based on age, seamless movement between general and vocational education, etc.

iii. Clear Understanding of How Skill is Formed is Required

What constitutes skills? What makes a welder a proficient welder? Cognitive skills earned at the primary and secondary level, off-job training at training institute, on job training, experiences, etc. matter in producing a skilled welder. That is, understanding of the skill production function - the factors and the process that contribute to skill production, is essential for designing the skill development framework. Hence, the role of vocational training cannot be seen in isolation; it has to be embedded in the overall education systemof the country. Without solid foundation in the primary level, we cannot expect better outcome in the secondary level and similarly, sound primary and secondary training laysthe foundation for skill accumulation in the vocational education as well as in the tertiary level. 'Skills beget skills', though sounds like a catch-22 problem, - is the main mantra for any skill development strategy.

iv. Alignment of Education and Skill Development Policies with IndustrialPolicy and Long Term Plans

Every developing country has an aspiration and plan on how to grow and how to grow fast. Hence the policy makers envisage the share of manufacturing along the transitional path and the sectors that will push the manufacturing growth. This projection is laid out in the Five Year Plan and the Industrial Policy elaborates the details of the route to higher industrial growth in Bangladesh. One of the critical elements required for the industrial growth is the human capital. That is, the plan for developing

human capital has to be aligned and consistent with the industrial policy and growth strategy. Education and skill development policies cannot be stand-alone documents. Since the country aspires to becomean upper middle country by 2030, it is essential to investment in human capital to help grow the thrust sectors as defined in the industrial policy. The polices that highlights the trade-offs between STEM (Science, technology, engineering and mathematics) vs. other streams, between general and vocational education, between tertiary vs. non-tertiary education have to be aligned with the industrial policy and the projected growth path of thecountry.

v. Sector Wide Approach (SWAp) for Secondary Education and TVET

The discussions have started to adopt sector wide approach for secondary and TVET education. The lessons learnt from the SWAp of the primary education and health sector can be applied to the secondary education and TVET to enhance the efficiency of the use ofresources and to avoid duplications through better coordination.

vi. Informed Agent: Easily Accessible Information on Skill DevelopmentOpportunities

The ideal framework for skill development should create such an enabling situation so that all can make informed decision about the choice of education stream, disciplines and career.Is the rate of return of vocational education is higher compared to comparable groups who choose general stream? How many students who pass SSC and HSC are aware of the vocational stream, particularly in the rural areas? How many are them are aware of the job prospects of different education stream? Anecdotal evidence suggest that there is a severelack of awareness about the vocational education and its job prospects. While the government is expanding the reach of the vocational education, the need for demand side interventions such as social campaign is absent in the current policy debate on education and training. Therefore, creation of informed citizens about the full spectrum of opportunities of education and skill development is a precondition for the human capital development strategy of the country.

vii. Social Recognition for Vocational Education

How society values a graduate of the vocational education also determines the success of these institutions and the overall skill development interventions of the government. Therefore, it requires to invest in image building of these professions.

viii. Data to track sector specific skills and skill mismatch

Unfortunately, we don't have the data to track the skill level and skill mismatch at the sectoral level. In order to keep track of the progress and monitoring we need quality data tobe generated at regular basis. In order to monitor the progress of SDG-4, we also require such data. To this end, BBS can take the initiative to conduct separate survey on skills or can include a module in the existing labor force survey. A subsample can also focus on cognitive and non-cognitive abilities.

8.2 Sector Specific Recommendations

i. Fostering industry-TVET linkage

It is essential to foster industry-TVET linkage through an implementable framework for electrical and electronics sector. We found in our study that the linkage between industryand TVET is very low. Enterprises hardly send their employees to the training institutes and training institutes, largely pubic ones, hardly reach out to the industry. While there isa law that certain fraction of the workers must be apprentice, the enterprises hardly followthis law and there is no monitoring from the government.

ii. Preparation for embracing 4IR

A roadmap and an action plan for embracing 4IR in electrical and electronics sector should be prepared which will guide the supply of training in the coming years. While the industry leaders are not worried about the automation and the threat that 4IR poses, it is important for the government to start preparation for this transition. According to a study conducted by the Aspire to Innovate (A2i), about 5.5 million people is likely to lose their jobs in the next 10 years in Bangladesh due to the 4IR. However, it is also expected that this new wave of technological revolution will create about 10 million jobs. Some of the sectors where most of the jobs will be created are Industrial Robotics control, automated packaging, Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM), 3D printing, internet of things, cyber security, and big data analytics, etc. This has serious implications for the light engineering sectors as this sector will experience a transformation from labor intensive sector to capital intensive ones in the near future in order to sustain in the global competition.

iii. Experiences of large successful industries should be replicated

Now the country has many successful industries in electrical and electronics sector. Experiences of the large and reputed enterprises in electronics sector should be replicated for other industries in skilling up the technical personnel.

8.3 Recommendations for SEIP for designing the second phase

i. Electrical and electronics sector should be a priority for SEIP in the second phase. The country needs technicians and electrical engineers (graduate and diploma) of international standards who are market-ready. The industrialization of Bangladesh critically depends on how the universities, poly-technical institutes and other TVET institutes respond to the market needs.

ii. Greater focus needed on mid-level to advanced courses. Currently SEIP has started working with a couple of universities (e.g., Bangladesh University of Engineering and Technology, East West University) and institutes (e.g., Bangladesh Institute of Governance and Management) for delivering higher level courses. The course curricula need to be streamlined in consultation and collaboration with the industry so that they reflect the demand them industries.

iii. Right combination of technical vs. management training has to be ensured. SEIP is currently delivering a few courses on management. This has to be reassessed as the interventions of SEIP should be in the areas where the private sector is not doing well or has little incentives to provide such training.

iv. Soft skills for the workers can be included in the curricula. Soft skill has become an integral part of the skill sets of the workers and it is found that soft skills can be taught.

v. Technical institutes should be the prime vehicle for delivery of training. Instead of creating any new institutions, SEIP should focus on strengthening the current institutes, particularly for delivering low level of technical skills. The TVET experts suggest that there are sufficient number of training institutes in Bangladesh, both public and private. What is required is up-gradation of these institutes.

vi. Strengthening of the teachers' training institutes for TVET should be a priority for the second phase of SEIP. There are only a few training institutes in the country for the training of the teachers of TVET. SEIP can take initiatives to upgrade these institutes in the second phase.

vii. For high level of technical skills, universities should be focal point for delivering training.

While SEIP has started working with the universities, this collaboration need to be strengthen through assessing their areas of strength in delivering training.

viii. Right combination of fresh trainees (who are in school to job transition) vs. on-job training (who are in job) need to be ensured. The current combination is about 80 and 20 percent respectively, as revealed in FGD. SEIP can start two different tracks for the fresh trainees (skilling) and on-job training (reskilling and up- skilling)

ix. Partnership with large individual industries should be fostered as they operate on the technological frontier for the country. There are a large number of conglomerates in the electrical and electronics sector in the country which are technologically sophisticated and producing quality products competing with the international market. The industries which are bringing new technology and skilling up their employees on their own, should be brought under one umbrella. These are the market leaders and their strategies for skilling should be followed.

x. Ranking of training institutions can ensure quality through competition. The potential trainees can also take informed decision using such rankings.

xi. Offering scholarships to the trainees can incentivize the potential students. The field experiences suggest that many potential students cannot enroll for training for the lack of admission fees. Also, the trainees need some allowances to sustain in the training program if the length of the program is long. This can be experimented in the second phase.

xii. Demand side interventions are needed to create demand for vocational training. The field experiences suggest that many potential trainees are not aware of such training provided by SEIP. Mass campaign is required to inform citizen about the benefits of technical and vocational training. The social stigma regarding vocational education also needs to be addressed.

xiii. Partnering with international training institutions can ensure quality and accreditation. SEIP can partner with internationally reputed training institutes to deliver high end training.

Appendix

Table 52: Technical and vocational of the workers arranged by employers: Managers

Managers	Obs.	Duration of the course (%)						Certified(%)	BTEB Certified (%)	Satisfaction
Category of Training		< 1 week	1-2 weeks	3-4 weeks	1-3 mon.	4-6 mon.	>6 mon.			Scale of 1 to 10
Others	2	50	50					50	50	6.5
Full sample	2	50	50					50	50	6.5

Table 53: Technical and vocational of the workers arranged by employers: Technicians and associate professionals

Technicians	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Satisfaction
Category of Training		< 1 week	1-2 weeks	3-4 weeks	1-3 mon.	4-6 mon.	>6 mon.			Scale of 1 to 10
Engineering& Technical	3			66.67	33.33			33.33	66.67	7
Manufacture & Crafts	1			100				0	0	7
Service and creative courses	1		100					0	0	7
Others	4	100						0	0	6
Full sample	9	44.44	11.11	33.33	11.11			11.11	50	6.56

Table 54: Technical and vocational training of the workers arranged by employers: Craft-workers

Crafts workers	Obs.	Duration of the course (%)						Certified (%)	BTEB Certified (%)	Satisfaction
Category of Training		< 1 week	1-2 weeks	3-4 weeks	1-3 mon.	4-6 mon.	>6 mon.			Scale of 1 to 10
Engineering & Technical	4	25	25	25		25		25	50	7.33
Manufacture & Crafts	2		50		50			50	50	7
Others	1	100						0	0	8
Full sample	7	28.57	28.57	14.29	14.29	14.29		28.57	42.86	7.57

Table 55: A4.1 Desired level of qualification of the workers (Large Firms)

Occupation (Large firms)	Total Emp.	Share of desired qualification (science)	Share of desired qualification (Arts)	Share of desired qualification (Commerce)	No preference for field of education	Desired level of education (Years)	Desired level of experience at entry (Years)
Manager	33	31.17			67.97	11.00	2.38
Professional	8	100				16.00	4.50
Sales and clerk	76	10.53			89.47	9.79	1.37
Technician	31	12.5			87.5	9.75	1.88
Craft and others	165	4		2.75	93.25	8.51	1.57
Full sample	313	25.24		0.64	74.12	10.57	2.19

Note: Large firms are Walton, RFL, Minister, My One, and Symphony

Table 56: A4.2 Desired level of qualification of the workers (Small Firms)

Occupation (SmallFirms)	Total Emp.	Share of desired qualification (science)	Share of desired qualification (Arts)	Share of desired qualification (Commerce)	No preference for field of education	Desired level of education (Years)	Desired level of experience at entry (Years)
Manager	79	22.32	0.69		70.42	10.36	4.23
Professional	14			100		16.00	5.00
Sales and clerk	128	41.38			55.17	10.59	6.83
Technician	57	3.7		3.7	92.59	9.59	4.30
Craft and others	496	4.5	2.75	2.5	90.25	7.48	1.90
Full sample	774	18.35	1.8	4.01	75.84	9.83	3.91

Table 57: A 4.3 Desired level of qualification of the workers (2-digit level)

Occupation	Total Emp.	Share of desired qualification (science)	Share of desired qualification (Arts)	Share of desired qualification (Commerce)	No preference for field of education	Desired level of education (Years)	Desired level of experience at entry (Years)
Managing Director	6	22.54	0.54	7.04	69.01	10.94	3.20
Manager/President/ Production manager	105	25.07		3.25	71.68	10.46	3.75
Electrical Engineer/Molding Engineer/Mechanical Engineer	7				100	16.00	3.02
Accountant/CA Accountant/Brand Promotion officer	14	33.33		66.67	0	16.00	4.67
Foreman/Engineer/Supervisor/Technician	178	25.07			74.93	10.41	5.65

Occupation	Total Emp.	Share of desired qualification (science)	Share of desired qualification (Arts)	Share of desired qualification (Commerce)	No preference for field of education	Desired level of education (Years)	Desired level of experience at entry (Years)
Executive/Admin officer	26	18.18			81.82	9.82	1.36
Cook man/Caretaker	17				100	6.20	1.20
Sales officer/Marketing Man/Commercial Officer	8			50	50	15.00	7.50
Security/Gateman	55	9.09			90.91	7.88	3.18
Painter mechanic/Varnish mechanic	12				100	8.00	1.00
Boring man/Welding man/Welder/Drilling man	263				100	7.64	1.66
Electrician/Crane grading worker	48				100	7.88	1.69
Quality In charge/Packaging man/ Weaving Machine Operator	84				100	6.70	1.70
Painting machine operator Cold heading ma	67				100	7.13	2.44
Driver/Power press man/hydraulic machine operator	25				100	10.00	3.60
Edm machine/Iron man laundry man	39				100	7.52	2.07
Office assistant/Cleaner/Peon	45				100	7.50	1.50
Helper/Trimming machine operator	30				100	9.43	1.29

Table 58: Actual qualification (Large Firms)

Occupation (Large firms)	Total Employment	Average qualification level (Science)	Average qualification level (Arts)	Average qualification level (Commerce)	Average qualification level (None)	Years of education	Average years of experience at the entry level
Manager	33	41.56	28.57			9.42	3.15
Professional	8	100				16.00	4.50
Sales and clerk	76	15.79	57.89		26.32	9.89	1.21
Technician	31	12.5	58.33		29.17	8.67	2.75
Craft and others	165	8.11	32.43		59.46	7.35	2.14

Occupation (Large firms)	Total Employment	Average qualification level (Science)	Average qualification level (Arts)	Average qualification level (Commerce)	Average qualification level (None)	Years of education	Average years of experience at the entry level
Full sample	313	32.91	34.19		32.9	10.76	3.125

Note: Large firms are Walton, RFL, Minister, My One, and Symphony

Table 59: Actual qualification

Occupation (SmallFirms)	Total Employment	Average qualification level (Science)	Average qualification level (Arts)	Average qualification level (Commerce)	Average qualification level (None)	Years of education	Average years of experience at the entry level
Manager	79	14.19	6.23	2.08	75.43	8.58	4.41
Professional	14	100				14.00	
Sales and clerk	128	17.24		3.45	72.41	8.41	2.31
Technician	57		3.7		92.59	6.44	3.88
Craft and others	496	2.88	1.44		94.96	4.88	2.45
Full sample	774	11.89	5.04	1.68	79.33	7.84	3.95

Table 60: Actual qualifications (2-digit level)

Occupation	Total Emp.	Average qualification level (Science)	Average qualificationlevel (Arts)	Average qualificationlevel (Commerce)	Average qualificationlevel (None)	Years of education	Average years of experience at the entry level
Managing Director	6	25.35	9.86	7.04	57.75	11.06	2.97
Manager/President/Production manager	105	21.68	12.87	0.95	64.5	9.27	3.14
Electrical Engineer/Molding Engineer/Mechanical Engineer	7	100			0	15.46	1.00
Accountant/CA Accountant/Brand Promotion officer	14	20.33		45	34.67	15.33	1.25
Foreman/Engineer/Supervisor/Technician	178	13.51	16.22	2.7	67.57	8.70	3.46
Executive/Admin officer	26	27.27	45.45		27.28	10.00	2.27
Cook man/Caretaker	17		20		80	7.40	3.60
Sales officer/Marketing Man/Commercial Officer	8				100	10.00	4.00
Security/Gateman	55	6.82	31.82		61.36	7.39	3.29
Painter mechanic/Varnish mechanic	12				100	4.75	4.00
Boring man/Welding man/Welder/Drilling man	263	3.9	9.09		87.01	5.45	3.70
Electrician/Crane grading worker	48				100	5.23	3.54

Occupation	Total Emp.	Average qualification level (Science)	Average qualification level (Arts)	Average qualification level (Commerce)	Average qualification level (None)	Years of education	Average years of experience at the entry level
Quality In charge/Packaging man/ Weaving Machine Operator	84		10		90	4.70	3.80
Painting machine operator Cold headingma	67				100	5.75	4.00
Driver/Power press man/hydraulic machine operator	25				100	7.40	4.25
Edm machine/Iron man laundry man	39		3.45		96.55	4.20	4.03
Office assistant/Cleaner/Peon	45				100	5.50	4.00
Helper/Trimming machine operator	30		71.43		28.57	9.50	2.57

Table 61: Horizontal and vertical mismatch (Large firms)

		Vertical mismatch			Horizontal mismatch
		(Years of schooling)			(field of study)
Occupation (Large firms)	Total Employment	Total	Over Qualification	Under qualification	
Manager	33	51.95	84.17	15.83	16.2
Professional	8				12.5
Sales and clerk	76	36.84	71.43	28.57	19.51
Technician	31	41.67	40	60	4.17
Craft and others	165	72.97	37.04	62.96	
Full sample	313	57	73.17	26.83	28.7

Note: Large firms are Walton, RFL, Minister, My One, and Symphony

Table 62: Horizontal and vertical mismatch (Small Firms)

		Vertical mismatch			Horizontal mismatch
		(Years of schooling)			(Field of study)
Occupation (Small Firms)	Total Employment	Total	Over Qualification	Under qualification	
Manager	79	74.22	18.88	81.12	19.57
Professional	14	100		100	100
Sales and clerk	128	79.31	4.35	95.65	33.33
Technician	57	92.59	20	80	7.41
Craft and others	496	87.05	9.92	90.08	
Full sample	774	70.19	16.33	83.47	12.78

Table 63: Horizontal and vertical mismatch (2-digit level)

Occupation		Vertical mismatch (Years of schooling)			Horizontal mismatch (field of study)
	Total Employment	Total	Over Qualification	Under qualification	
Managing Director	6	45.07	56.25	43.75	5.77
Manager/President/Production manager	105	70.05	31.72	68.28	17.07
Electrical Engineer/Molding Engineer/Mechanical Engineer	7	40	28.5	71.5	42.85
Accountant/CA Accountant/Brand Promotion officer	14	33.33		100	50
Foreman/Engineer/Supervisor/Technician	178	62.16	4.35	95.65	25
Executive/Admin officer	26	63.64	71.43	28.57	50
Cook man/Caretaker	17	60	66.67	33.33	0
Sales officer/Marketing Man/Commercial Officer	8	100	23.08	76.92	50
Security/Gateman	55	68.18	66.67	33.33	2.44
Painter mechanic/Varnish mechanic	12	100		100	0
Boring man/Welding man/Welder/Drilling man	263	87.01	66.67	33.33	0
Electrician/Crane grading worker	48	100		100	0
Quality In charge/Packaging man/ Weaving Machine Operator	84	80	12.5	87.5	0
Painting machine operator Cold heading ma	67	68.75	9.09	90.91	0
Driver/Power press man/hydraulic machine operator	25	100	40	60	0
Edm machine/Iron man laundry man	39	82.76	4.17	95.83	0
Office assistant/Cleaner/Peon	45	100		100	0
Helper/Trimming machine operator	30	14.29	100	0	0

Table 64: Difficulties in filling up vacancies (Large firms)

Occupation (Large firms)	Total Employment	Difficultiesin filling up vacancies (1 to 10 scale)	If a vacancy is occurred/posted/advertised today, howlong will it take to fill up the position?			
			Almost instantly	Less than a week	More than a week and less than a month	A month or morethan a month
Manager	33	6.55			42.42	57.58
Professional	8	5.00			57.14	42.86
Sales and clerk	76	6.21	3.17	4.76	57.14	34.93
Technician	31	6.00			93.33	6.67
Craft and others	165	6.06	1.44	6.47	71.22	20.87
Full sample	313	6.12	1.47	4.41	72.79	21.33

Note: Large firms are Walton, RFL, Minister, My One, and Symphony

Table 65: Difficulties in filling up vacancies (Small firms)

Occupation (Small Firms)	Total Employment	Difficulties in fillingup vacancies (1 to 10 scale)	If a vacancy is occurred/posted/advertised today, how long will it take to fill up the position?			
			Almost instantly	Less than a week	More than a week and less than a month	A month or morethan a month
Manager	79	6.32		1.28	33.33	65.39
Professional	14	6.08	7.69	15.38	30.77	46.16
Sales and clerk	128	6.87		3.17	61.13	35.7
Technician	57	5.63	6.56	11.48	50.82	31.32
Craft and others	496	6.34	3.02	19.9	63.22	13.86
Full sample	774	6.37	2.52	13.78	54.96	28.74

Table 66: Difficulties in filling up vacancies (2-digit level)

Occupation	Total Employment	Difficulties in filling up vacancies (1 to 10 scale)	If a vacancy is occurred/posted/advertised today, how long will it take to fill up the position?			
			Almost instantly	Less than a week	More than a week and less than a month	A month or more than a month
Manager/President/Production manager	105	6.45		0.96	19.23	79.81
Electrical Engineer/Molding Engineer/Mechanical Engineer	7	5.86	14.29	28.57	57.14	0.00
Accountant/CA Accountant/Brand Promotion officer	14	5.58			33.33	66.67
Foreman/Engineer/Supervisor/Technician	178	6.76	1.18	4.14	56.8	37.88
Executive/Admin officer	26	5.75			50	50.00
Cook man/Caretaker	17	6.17			33.33	66.67
Sales officer/Marketing Man/CommercialOfficer	8	7.43			42.86	57.14
Security/Gateman	55	5.64	6.06	10.61	59.09	24.24
Painter mechanic/Varnish mechanic	12	6.44			88.89	11.11
Boring man/Welding man/Welder/Drilling man	263	6.84	0.84	11.81	69.62	17.73
Electrician/Crane grading worker	48	6.97		3.23	90.32	6.45
Quality In charge/Packaging man/ Weaving Machine Operator	84	5.32		15.09	75.47	9.44
Painting machine operator Cold headingma	67	5.59	9.26	27.78	53.7	9.26
Driver/Power press man/hydraulicmachine operator	25	5.96		8.7	60.87	30.43
Edm machine/Iron man laundry man	39	6.28		24	56	20.00

Occupation	Total Employment	Difficulties in filling up vacancies (1 to 10 scale)	If a vacancy is occurred/posted/advertised today, how long will it take to fill up the position?			
			Almost instantly	Less than a week	More than a week and less than a month	A month or more than a month
Office assistant/Cleaner/Peon	45	5.53	2.86	8.57	51.43	37.14
Helper/Trimming machine operator	30	5.37	11.11	18.52	55.56	14.81

Table 67: Growth projection of the workers by occupations (Large Firms)

Occupation (Large firms)	Total employed in 2019	Growth of the number of works in next 5 to 10 years				Percentage increase in 2023 relative to 2019	Percentage increase in 2025 relative to 2019	Percentage increase in 2030 relative to 2019
		No growth	Moderate growth	High growth	Very high growth			
Manager	83	6.06	93.94			37.35	75.90	151.81
Professionals	97		100			-49.48	-35.05	2.06
Technician	1045		48.57	51.43		28.80	55.89	86.99
Sales and clerk	193		65.38	34.62		39.90	81.87	124.35
Crafts and other	3777		41.18	57.35	1.47	22.16	45.72	80.41
Total	5195	0.74	53.31	45.22	0.74	23.06	48.08	83.04

Note: Large firms are Walton, RFL, Minister, My One, and Symphony

Table 68: Growth projection of the workers by occupations (Small firms)

Occupation (Small firms)	Total employed in 2019	Growth of the number of works in next 5 to 10 years				Percentage increase in 2023 relative to 2019	Percentage increase in 2025 relative to 2019	Percentage increase in 2030 relative to 2019
		No growth	Moderate growth	High growth	Very high growth			
Manager	144	8.86	86.08	5.06		22.92	68.06	120.83
Professionals	29	7.14	71.43	21.43		89.66	162.07	255.17
Technician	647	6.45	75	18.55		42.50	79.29	128.28
Sales and clerk	193	9.43	73.58	16.98		19.69	59.59	107.77
Crafts and other	2437	3.74	61.35	33.17	1.75	46.90	91.51	151.99
Total	3450	5.37	67.96	25.63	1.04	43.91	87.04	144.64

Table 69: Growth projection of the workers by occupations (2-digit level)

Occupation	Total employed in 2019	Growth of the number of worksin next 5 to 10 years				Percentage increase in 2023 relative to 2019	Percentage increase in 2025 relative to 2019	Percentage increase in 2030 relative to 2019
		No growth	Moderate growth	High growth	Very high growth			
Managing Director	2	33.33	66.67			0.00	50.00	500.00
Manager/President/Production manager	8	6.67	89.52	3.81		0.00	12.50	437.50
Electrical Engineer/Molding Engineer/Mechanical Engineer	14		71.43	28.57		64.29	114.29	271.43
Accountant/CA Accountant/Brand Promotionofficer	31	7.69	92.31			29.03	29.03	193.55
Foreman/Engineer/Supervisor/Technician	40	4.65	66.28	29.07		37.50	85.00	200.00
Executive/Admin officer	47	59.09	40.91			36.17	95.74	159.57
Cook man/Caretaker	93		37.5	62.5		-26.88	0.00	145.16
Sales officer/Marketing Man/Commercial Officer	95		64.29	35.71		44.21	101.05	158.95
Security/Gateman	117		83.33	16.67		35.90	67.52	143.59
Painter mechanic/Varnish mechanic	128	9.8	76.47	13.73		44.53	75.78	181.25
Boring man/Welding man/Welder/Drilling man	159		57.14	42.86		23.27	69.18	178.62
Electrician/Crane grading worker	166	1.29	55.79	42.06	0.86	51.20	104.82	177.11
Quality In charge/Packaging man/ Weaving Machine Operator	208	3.03	42.42	42.42	12.13	35.58	81.73	145.19
Painting machine operator Cold heading machine	219	1.82	43.64	54.55		34.70	73.97	84.47
Driver/Power press man/hydraulic machine operator	370	1.79	71.43	26.79		52.16	92.70	164.05
EDM machine/Iron man laundry man	533	12.5	70.83	16.67		44.28	69.98	119.14
Office	1377	8.33	33.33	54.17	4.17	18.74	38.13	62.45

Occupation	Total employed in 2019	Growth of the number of worksin next 5 to 10 years				Percentage increase in 2023 relative to 2019	Percentage increase in 2025 relative to 2019	Percentage increase in 2030 relative to 2019
		No growth	Moderate growth	High growth	Very high growth			
assistant/Cleaner/Peon								
Helper/Trimming machine operator	1564	2.7	75.68	21.62		32.48	61.13	96.36
Helper/Trimming machine operator	2528	4	40	40	8	38.41	76.19	127.45