SKY
Skills and Knowledge for Youths

名古屋大学
NAGOYA UNIVERSITY

SKY PROJECT
NAGOYA UNIVERSITY

Summary Report

SUMMARY REPORT OF THE TRAINING NEEDS ASSESSMENT:
EMPLOYABLE CAPACITY DEVELOPMENT FOR WOMEN PROJECT IN PUNJAB, PAKISTAN

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ACRONYMS

FW	Factory Worker
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HBW	Home-Based Worker
IFC	International Finance Cooperation
ILO	International Labor Organization
JICA	Japan International Cooperation Agency
LFPR	Labor Force Participation Rate
NAVTTC	National Vocational & Technical Training Commission
NSS	National Skills Strategy
NVQF	National Vocational Qualification Framework
OJT	On-the-Job Training
PCA	Principal Component Analysis
PCSW	Punjab Commission on the Status of Women
PPP	Public-Private-Partnership
P-SDC	Punjab Skill Development Council
P-TEVTA	Punjab Technical Education and Vocational Training Authority
PVTC	Punjab Vocational Training Council
SEM	Structural Equation Modelling
SKY	Skills and Knowledge for Youths Project
SMEDA	Small and Medium Enterprises Development Authority
TNA	Training Needs Assessment
TSP	Training Service Providers
TVET	Technical and Vocational Education and Training

EXECUTIVE SUMMARY

In order to advance gender equity and to supply a skilled workforce for the formal industrial sector, which contributes to the country's economic growth, the government of Punjab has prioritized Technical and Vocational Education and Training (TVET) as a means to empower young female workers. With the technical and financial support from JICA, TVET authorities of Punjab are preparing a new project to improve TVET curricula to equip female students with knowledge and skills for enhanced employability, with a particular focus on soft skills.

The Skills and Knowledge for Youths (SKY) research team of Nagoya University was requested by JICA to diagnose necessary skills to be prioritized in the curriculum reform through the investigation of work environment and requirements in the formal sector companies, conditions of home-based workers, the nature of skill mismatches between the industry's workforce demand and workers' actual capacities, and the domains of curriculum which can be improved to mitigate the skills mismatch. Using its unique skills assessment module, which is composed of questionnaires for workers and stakeholders and written and practical tests for workers, the SKY research team has conducted a survey from August to September 2023. It involved managers of 17 firms and 425 females who work in these firms and at home. A few TVET teachers also answered a questionnaire.

In this paper, we highlight the outcomes of the training needs assessment and suggest some factors which enable or impede women to learn new skills and achieve higher productivity. First, we describe the characteristics of skills of workers depending on their workplace, comparing among firms and between those working in the formal sector and at home. Then, we will shed light on people with higher skills and their characteristics. Lastly, based on these findings, we provide suggestions for improving the TVET curriculum and sensitizing employers.

Our analysis tells, unlike the assumption of some people we interviewed in Punjab, there is no significant difference in most of the skills tested, including reading comprehension, calculation, theoretical knowledge of garment production, and soft skills. We didn't identify any significant differences between home-based and formal sector workers, except for the practical skills, which were determined by various factors.

While the differences in the workers' abilities were not determined by their employment status, there are still significant variations across survey participants in terms of their skills. We found that workers who demonstrated higher levels of practical skills were likely to have higher levels of reading skills. They are also characterized by some types of soft skills which relate to their willingness to learn new things, improvement in work, and emotional stability. Further, the likelihood

of finding workers with higher practical skills is determined by the characteristics of the workplace. Firms which provide more opportunities for on-the-job training have a higher chance of having workers with good practical skills, while those with managers who adhere to the old stereotype of women staying at home or in subordinate positions at work do not seem to encourage women to perform well.

These findings suggest the importance of soft skills for improving productivity among female workers. At the same time, the nature of required soft skills is different depending on the overall productivity levels of firms. Low-productivity firms tend to require workers who are open to learn new things, while high-productivity ones are likely to have workers with a growth mindset and emotional stability. Therefore, soft skills development should be done in a manner relevant to the context, based on a close examination of the skills gap in respective firms.

Also, practical skills are always important determinants of rewards for workers (i.e. salaries). Therefore, firms' support for the continuous upgrading of practical skills through training and advice is highly recommended. Moreover, we suggest firms ensure positive workplace environments by promoting gender equality and supporting workers' initiatives in order to empower female workers and enhance their work productivity.

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- Employable Capacity Development for Women in Punjab Project, JICA Pakistan, the Japan International Cooperation Agency (JICA)
- Punjab Technical Education and Vocational Training Authority (P-TEVTA), Government of the Punjab
- Punjab Vocational Training Council (PVTC)
- HomeNet Pakistan

INTRODUCTION

Ensuring equitable opportunities for women to education and employment would not only empower women with better income and well-being but also significantly contribute to national economic growth. However, according to the recent Global Gender Gap report by the World Economic Forum (2023), Pakistan ranks fifth lowest in terms of gender parity, standing at the 142nd place out of 146 nations. The literacy rate of women in Punjab is worrisome, with the average at 58.4%, compared to that of 73.4% of males, according to Pakistan Economic Survey 2022/23 (2023). Likewise, despite being nearly half (approximately 49%) of the total population of the province (Javed & Khan, 2018), women's Labor Force Participation Rate (LFPR) is only 26.5%, compared to 69.9% for men (Pakistan Bureau of Statistics, 2018). The low rate of employment is a result of wide-ranging issues, including economic restrictions, limited access to resources and education, and prevalent societal values and norms regarding women. In the garment and textile sector, only approximately 30% of workers are female (Hisam, 2017). A study conducted by Khan (2010) reveals that women have fewer chances for skills development and training, and employers' biased perceptions of female workers caused the minimal LFPR for women in this country. Under such a circumstance, so-called home-based workers (HBW), who work inside their own or others' compounds as piece-rate workers, are prevalent. 72% of women aged between 15 and 64 in Punjab are considered home-based or piece-rate workers (PCSW, 2018). In addition, while the supply of young skilled workers is highly critical, it is disheartening to note that 47% of women aged between 15 and 24 are neither in education nor training programs. Likewise, only half of the girls in primary education survive to the secondary level (Punjab Commission for the Status for Women, n.d.).

To address the gender disparities and empower the skilled women workforce, the Punjab government places a great priority on TVET. With this emphasis, the Punjab Technical Education and Vocational Training Authority (P-TEVTA) and Punjab Vocational Training Council (PVTC) are aiming to improve their vocational programs to empower women economically through skills formation. Based on a longstanding relationship with the Punjab government, the Japanese International Cooperation Agency (JICA) embarked on a pilot project to provide technical support for the aforementioned TVET authorities in advancing the curriculums for enhancing capacity among the young female workforce.

The Skills and Knowledge for Youths (SKY) research team demonstrated through multi-country case studies that the expectations of industrial stakeholders for skills to be trained by educational institutions are often unmet (Yamada, 2023; Yamada & Otchia, 2022). At the beginning stage of the collaborative project between JICA and Punjab TVET authorities, the SKY research team was involved in conducting the training needs assessment

(TNA) to provide the project's stakeholders with insights by identifying skills gaps and mismatch among workforce supply and demand sides of the garment and textile sector.

The SKY is an interdisciplinary research team at Nagoya University in Japan that has been working on skills development for the workforce in developing countries, particularly in Africa and Asia. One of our academic expertise is creating and conducting a unique standardized skills assessment module, which examines different skill types from various perspectives based on the specificity of the study context. Our data and findings have been supplying fundamental resources for governments, training institutions, and private entities in many countries for evidence-based decision-making. For the current project, we evaluated the skill requirements based on local needs, drawing the perspective of female workers and stakeholders in the garment and textile sector together through a survey using our skills assessment module. The findings of TNA will be used for JICA and TVET authorities to upgrade vocational training courses.

Recognizing the unique national conditions that make a majority of women work informally, the TVET curriculum reform aims to equip marginalized female youth with employable capacities either to become entrepreneurs or to get formal employment in firms. Reflecting this overall direction of the JICA-TVET collaboration project, the SKY team's TNA tried to investigate whether differences in skills exist between home-based and formal industrial workers. Not only to examine the differences by employment status to provide insights for improving the workforce's productivity, we also aimed to discover factors that affect workers' practical skills, which are considered to represent their productivity at work, from various approaches. Further, we analyzed the current TVET courses' curriculum. Referring to the outcomes of our skills assessment, we diagnosed the parts of the curriculum and teaching methods that would need to be revised so that the courses will be more relevant to the situations and suited for upskilling and empowering female students and workers.

In sum, the fundamental questions that this report tries to provide answers to are as follows:

- Do skills between home-based and factory workers completely differ from each other?
- What causes the differences between workers who demonstrate high practical skills and those who do not?
- Out of the influential factors, which are related to workplace and environment, and which are more related to individual abilities?
- What kind of implications can we draw from this study to improve the skills development programs and courses in the Punjab State of Pakistan?

The assessment module used in this study comprehensively captures the actual and perceived abilities of workers. Different types of skills related to workers' productivity were investigated, including:

- **Cognitive skills:** Cognitive skills involve reading, mathematic proficiency, and integrated skills, which refer to the ability to comprehend and apply reading and math skills to interpret tables and graphs. The test items are designed to measure such skills in relation to the workplace needs for garment production. Additionally, vocational knowledge, which encompasses basic knowledge about garment production, is another essential component. These cognitive skills are assessed through a written examination.

- **Soft skills:** Soft (or non-cognitive) skills encompass personality traits such as grit, decision-making, and emotional stability, as well as workplace-related behavioral skills like tidiness and teamwork that enable individuals to apply their cognitive and practical skills and enhance their productivity at work. Psychometric questionnaires were employed to assess this type of skill. There is no set of soft skills that is effective in all types of workers and workplaces. Therefore, it is important to identify those that are appreciated and required in their respective contexts. Based on the findings, this study indicates the types of soft skills that stood out in both high- and low-skill firms.

- **Practical skills:** Practical skills refer to the ability to apply cognitive knowledge and soft skills to produce actual products effectively. This study measures workers' practical skills by asking them to produce a shirt pocket according to the sample, using the pattern and materials provided. The practical test includes the production process, such as selecting materials, understanding patterns, cutting, sewing, ironing, and finishing, all within a 20-minute time constraint.

The three types of skills are interconnected and altogether contribute to workers' productivity. For instance, successfully completing a pocket within a limited 20 minutes requires quick and effective decision-making, as well as maintaining a calm and stable emotion in a stressful environment. Simultaneously, workers need to have adequate vocational knowledge to understand patterns and select the appropriate equipment and materials.

The TNA implementation consists of two phases: preliminary survey and assessment administration. In the first phase, during May 2023, the team did the initial situation analysis through observation and interviews in urban and rural areas of Lahore to gain a deep understanding of female workers' contexts, as well as social structures and values. This included investigating the perspectives and requirements of stakeholders regarding women's careers in the garment sector, such as female workers, TVET instructors, factory managers, and authorities in TVET and industrial sectors. Based on the initial findings, we added some question items and modified the standardized skills assessment module to meet the unique needs of the participants and social contexts in Lahore.

In the second phase, the skills assessment was conducted during August and September 2023. First, our team provided facilitation training for the assessment implementation staff and evaluators. Simultaneously, a pilot test was conducted, involving both home-based and factory workers, to finalize the assessment module incorporating technical and linguistic suggestions from Pakistani staff and the trial participants.

In this report, we discuss Pakistan's industrial situation in the first section. It will be followed by a chapter elaborating on the research design, including a discussion of our unique skills assessment module and characteristics of the research participation. Chapter 3 presents the comparison of different types of skills between home-based and industrial female workers. Then, Chapter 4 will explain the factors that could account for the variations in the practical abilities of female garment workers. Given that soft skills and conditions of firms are influential factors to explain variations in practical skills, we further investigate in what ways soft skills and workplace conditions affect. Thereafter, Chapter 5 presents the findings from the TVET curriculum analysis, which includes both programs for industrial garment stitching and domestic tailoring. Finally, the last section will conclude the report with policy implications and suggestions from our TNA findings.

1 THE PROFILE OF THE TEXTILE AND GARMENT SECTOR AND SKILLS DEVELOPMENT IN PAKISTAN

The garment and textile production sector in Pakistan, which this study focuses on, is a vital component of the country's economy. It contributes nearly a quarter of industrial value-added products and provides employment to about 40% of the industrial workforce. Additionally, this sector occupies an average share of about 60% of national exports (IFC, 2020). According to the Pakistani government's national development plan titled Pakistan 2025, the country aspires to achieve an inclusive and equitable economy and become an upper-middle-income country by 2025 (Planning Commission, 2023). Considering that Pakistan is the 9th largest exporter of garments and the 5th largest producer of cotton in the world, there is no doubt that the development of this economic sector is crucial for the country to achieve this goal.

Regardless, women's participation in economic productive activities is quite limited in this country. Despite increases in recent years, female labor force participation in Pakistan is 25%, well below rates for countries with similar income levels (Asian Development Bank, 2016). While the garment sector employs 40% of the Pakistani workforce as a whole, females occupy only 30% of it (GIZ, 2024). This ratio is extremely low, considering that the garment and textile industry tends to be female-biased, with 60~80% of the global workforce in this sector being women (ILO, 2023). As a means to mitigate the gender disparity in labor force participation, it will be useful to identify and promote enabling factors for female workers in this sector, where there lies high potential with their strengths to perform well. Such an effort would also contribute to pushing up the productivity of this national flagship industry as a whole.

Based on these observations, this chapter will summarize key issues regarding female participation in the labor market, not only in general but more specifically in the garment sector in Punjab, Pakistan. Since skills development is the critical node of individual and industrial development, the chapter also highlights the role of technical and vocational education and training (TVET) for the growth of the garment and textile sector and female empowerment.

1.1 TVET policies and structure in Punjab, Pakistan, and challenges faced by TVET Institutions

After the long neglect of TVET's planning and operation since the 1960s, renewed attention has been paid to this training sector in the last 20 years. National Vocational and Technical Training Commission (NAVTTC) was established in 2005 to regulate & manage the TVET Sector in Pakistan under the Ministry of Federal Education and Professional Training. Also, the National Skills Strategy was developed in 2009, the country's first policy specific to the skills sector. Several actions have already been taken on the recommendations contained in the NSS, which include developing the National Vocational Qualification Framework (NVQF), national qualifications system for teachers, code of conduct, accreditation system, human resources development policy for TVET, skill standards, and curricula in priority areas (NAVTTC, 2024).

At the provincial level, Technical Education & Vocational Training Authorities (TEVTAs), Vocational Training Council (VTC), and Skill Development Councils (SDCs) have taken charge of planning and executing training programs. TVET is also administered by provincial education and labor departments, ensuring a multifaceted approach to skills development (Shah and Khan 2017).

According to its Skills Development Sector Plan 2018, the government of Punjab recognizes that an important factor hampering the animation of the labor market is low skills and the lack of effective training for improving the capacities of working age population (15-64 years), particularly young adults aged between 15 and 29 (Government of Punjab 2015). According to the Labor Market Survey 2013, among working youths (15-29 years old) in the state of Punjab, more than 40% have an education of less than 12 years (44% of males and 47% of females), out of which, population without any schooling occupies significant proportion (19% and 30% for respective genders)(Pakistan Bureau of Statistics, 2015).

Given this generally low level of access to school, formal and nonformal TVET and on-the-job skills development are of fundamental importance as a path towards developing human capital. Regardless, only 12% of Punjab's working-age population (15-64 years) have acquired skills training (Pakistan Bureau of Statistics, 2015).

Challenges persist, including a significant gap between skilled labor demand and supply, highlighted by the annual demand for skilled workers far exceeding enrollment in TVET institutions. As of 2015, the gross annual training capacity of TVET programs in Punjab was reported to be about 164,000 individuals, far less than its target to reach 2.0 million (Government of Punjab, 2015). Efforts to address this gap face hurdles such as inadequate inclusivity, particularly for marginalized groups like women, the poor, and the disabled. Traditional skills often remain undervalued, hindering their formal training integration. Regardless of its importance, training in the garment and textile sector also lags behind the need for female upskilling and companies' labor demands.

1.2 Skills demands for garment and textile industry in Punjab

The garments sector in Punjab is primarily concentrated in Lahore, Faisalabad, Sialkot, and Gujranwala, with each cluster specializing in specific products. Lahore, the regional capital, focuses on denim products. Sialkot and Gujranwala excel in sports and technical wear, while Faisalabad mainly produces hosiery items. Despite the predominance of small and medium-sized entities, the sector has grown over the past three decades, with an average growth rate of 29%. However, this growth rate has slightly declined in the last decade due to challenges such as energy crises, security concerns, and global recession.

60% of entities that offer skills development programs related to garment and textile are located in Lahore, followed by Faisalabad, Islamabad, and Gujranwala, with limited representation from Rawalpindi and Gujrat. 60% of the training providers are private, 28% are public, and 12% operate under Public-Private-Partnership (PPP). However, 52% of TSPs report insufficient infrastructure (Grant Thornton International, 2015).

As the majority of programs are ad-hoc and unregulated, their quality often fails to meet demands. Also, with low funding, infrastructural conditions, and lack of expertise on the side of training providers, the range of skills taught in these programs is limited.

1.3 Skills development as a means of women's empowerment in Punjab, Pakistan

Gender disparities in Pakistan are pervasive, as highlighted by the country's low rankings on the Global Gender Gap Index (5th from the bottom in 2013). Despite comprising half of the working-age population, women's participation in the labor force remains low, with only 22.5% actively engaged. Urban areas exhibit significantly higher rates of female unemployment compared to rural areas, exacerbating gender inequalities. However, there is growing recognition within government and non-government sectors that this issue should be addressed.

The Technical and Vocational Education and Training (TVET) sector is recognized as a crucial tool for reducing unemployment, empowering women, and alleviating poverty. However, gender disparities persist within the sector, with limited enrollment of women in trades such as dressmaking, embroidery, and beauty services. Women's TVET institutes face numerous challenges, including limited capacity, outdated facilities, and less relevant curricula. Additionally, there is a considerable gender wage gap within the sector, further discouraging women from entering the workforce (Rehman, 2020).

There is an urgent need to reform the TVET system to address these disparities and make them inclusive and women-friendly. At the same time, addressing gender disparities in the TVET sector in Pakistan necessitates targeted interventions and concerted efforts from both government and non-government stakeholders.

In sum, the review of profiles of garment sector, skills development of the workforce particularly for women in this sector, and relevant policies and literature suggest the necessity of accurate diagnosis of the skills of women against the contexts in which they work. Unless we grasp the composition of skills the workers currently have and what hinders or enables them to learn new skills, the chance that the government's efforts toward reforming TVET to upskill and empower women will yield the desired results will be reduced. To contribute to the Government of Punjab and related entities, including P-TEVTA, P-VTC, and P-SDC, the SKY research team has conducted the survey, the outcomes of which are going to be presented in detail in the following chapters. We hope this report will provide evidence for the stakeholders in Punjab to make informed decisions.

2 RESEARCH DESIGN

2.1 Skills assessment module

To capture workers' essential skills and knowledge for garment production and grasp the nature of the skills mismatches between the industry's stakeholders, the SKY research team developed a unique skills assessment module, which comprehensively captures workers' skills in all dimensions relevant to their daily work environment. The standardized skills assessment model is comprised of three sections to evaluate different types of skills: (1) questionnaire, (2) written examination, and (3) practical skills examination. Likewise, the assessment module was designed for both workers and employers to reflect on each other to measure the disparities in perceptions of skills between them.

The questionnaire distributed to workers consists of items about individual demographic background, work and training experience, and scales to measure soft skills. The last section measures workers' soft skills through two psychometric scales. As mentioned in the introduction, soft skills in our study involve personality traits and workplace-related skills. First, personality traits consist of eight domains, including the Big Five, which is a well-known taxonomy of personality: extraversion, conscientiousness, openness, emotional stability, agreeableness, grit, decision-making, and hostile bias[1]. The scale for measuring participants' personality traits contains 26 items, asking participants to rate the frequency (from "Almost never" to "Almost always") with which they perform listed actions, such as "When doing a task, are you very careful?" and "Do you forgive other people easily?." The scale was adopted from the personality traits scale employed in the World Bank STEP Skills measurement survey conducted by Pierre et al. (2014). Each domain of personality traits was constituted by a group of question items on the scale.

Additionally, workplace-related skills are captured to understand the differences between workers' and employers' perceptions of attitudes at work. Similar to the scale for personality traits, we use a Likert scale to measure workers' perceptions of specific actions at the workplace. Participants were asked to rate their level of agreement (from "Strongly agree" to "Strongly disagree") with listed work-related scenarios, such as "If any unusual situation occurs during work, the workers share that with colleagues."

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[1] Definition of each soft skill according to Pierre et al. (2014)
Extraversion: the sociability and dominance displayed in social situations.
Conscientiousness: the tendency to follow the rules, control their impulses, set goals, plan, and obey societal norms.
Openness: the enjoyment of learning and experiencing new things.
Emotional stability (or Neuroticism): the propensity to have negative emotions.
Agreeableness: the tendency to be friendly and helpful towards others and willing to work with them.
Grit: a propensity to persist in pursuing long-term goals.
Decision-making: the tendency to have consequential and alternative solution thinking when making a decision.
Hostile bias: the tendency to perceive other people's actions as harmful.

Thereafter, the workers were given 90 minutes to complete reading, mathematics, integrated skills, and vocational knowledge tests in the written examination section. All exam questions were multiple-choice items. This section aims to capture their necessary cognitive skills for garment production. Home-based and factory workers were given the same assessment module. However, home-based workers were directed to skip questions about experiences in the factory as they were self-employed. The participants filled in the questionnaire and written examination using tablet devices.

After completion of the written examination, the assessment moved on to the practical skills test section. The practical test aims to capture workers' advanced garment-producing skills comprehensively. The test asked each worker to complete a shirt pocket according to the sample pocket and pattern within 20 minutes. During the process, from selecting materials to tidying up the workstations, each worker was evaluated by three graders who were experts from both TVET and garment industrial sides, based on the SKY project's standardized criteria. The graders also assessed the quality of the completed pockets. The graders' evaluation is recorded along an 11-item Likert-type scale from 1 (could not do well) to 5 (excellent).

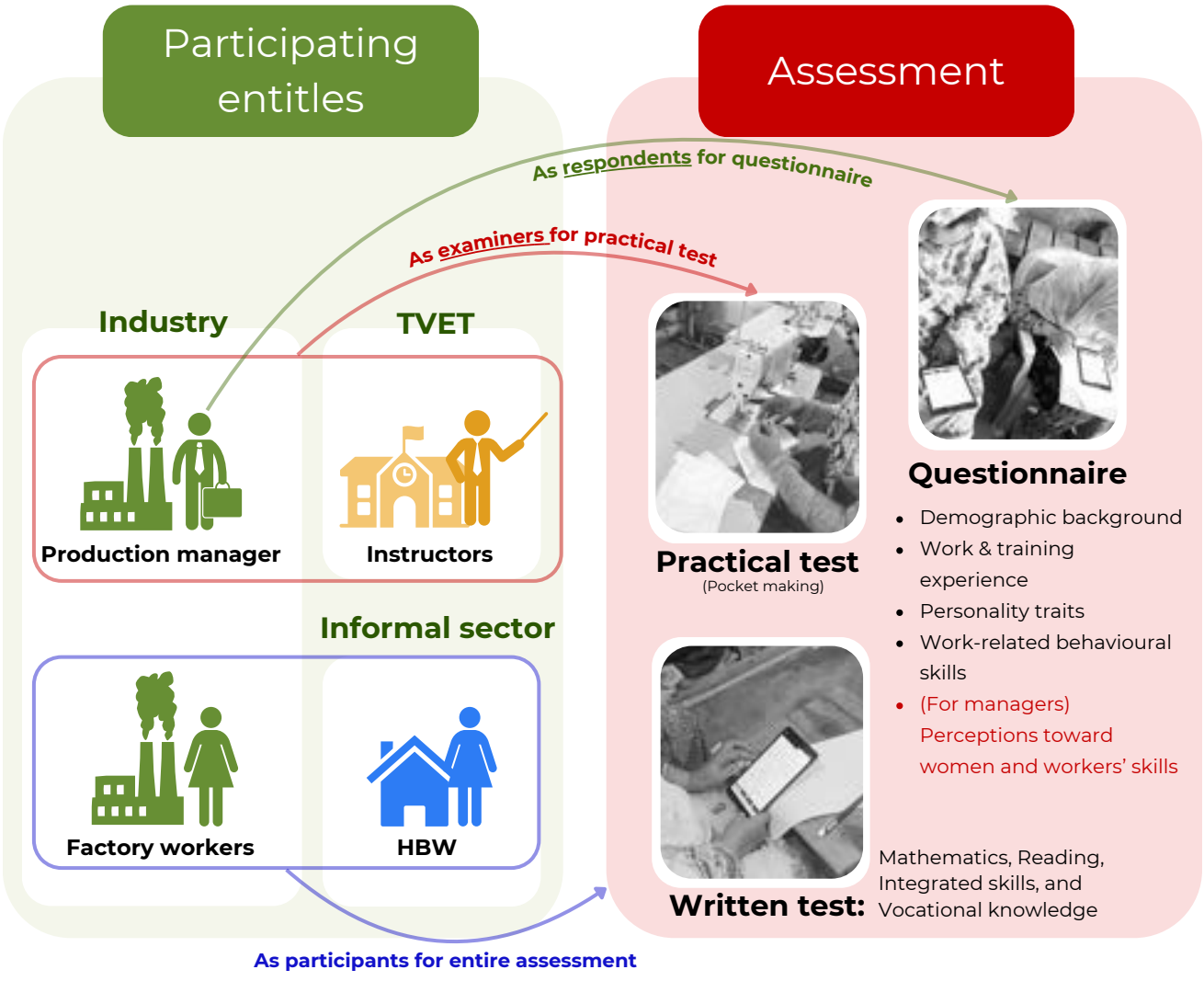


Figure 1. Conceptual framework of skills assessment operation

To understand skills demand from the perspective of employers, the assessment also involves factories' production managers to share their expectations toward skills for workers in the garment and textile sectors. The questionnaire for production managers includes questions about their personal demography and professional backgrounds, desirable personality, and work-related behaviors of workers. Besides, the SKY research team also developed a firm survey for factories' human resource managers to gather information about factory conditions, including the composition of employees by age, gender, position and specialization, types and frequency of training provided, and employment strategies. Figure 1 illustrates the constructs of the SKY skills assessment module, their respective participants, and the ways they mutually relate.

A key strength of our study lies in its methodology, which facilitates the comparison between expectations from employers and TVET instructors and the actual skills possessed by workers. We combine different instruments, such as questionnaires, cognitive skills tests, and practical skills tests, to comprehensively analyze the gap between supply and demand at two distinct levels: perception and actual skill. The questionnaires offer insights into stakeholders' perspectives, encompassing self-assessments by workers and the expectations of production managers. However, merely understanding perceptions is insufficient without examining how these perceptions translate into real-world practical skills or productivity. Practical skills, thus, need to be assessed by both employers and TVET sides. By involving stakeholders with different standpoints and expectations on skills in evaluating the real performance of test takers simultaneously, the influence of perceptions on a judgment can be contrasted.

2.2 Research participants and data collection

The assessment was conducted between August and September of 2023, involving 220 female home-based workers and 205 factory workers from 17 firms in Lahore, the capital city of Punjab. Also, one human resource and one production manager from each firm were invited to answer the questionnaire for this study.

Table 1 summarizes the demographic information of the participants. Home-based and factory workers' characteristics are different in a few significant aspects. Home-based workers are around five years older than factory workers on average and earn 40% of the average monthly income of factory workers. In contrast, factory workers work approximately 2.5 hours more than home-based workers per day. In terms of the family's background, both groups share similar characteristics in household size and the economic level of the family. Both groups of workers' families consist of around 6 members. The economic level of the family was constituted by summing scores of the household's ownership of a DVD/CD player, TV, cell phone, computer, internet, bank account, car, motorcycle, bicycle, and refrigerator/freezer. Factory and home-based worker groups similarly rated their family's economic level at approximately 3.2 points. Additionally, both groups of workers share a similar community type in which they reside. The variable community type depicts the categorization of participants' residing areas: rural and semi-urban areas were coded as 0, while urban area was coded as 1. The average score of both groups was around .8, signifying that most participants live in urban areas.

Figure 2 illustrates the comparison between factory and home-based workers regarding participants' experiences in work and training. Women in Lahore generally start their first work around the age of 19 (see Table 1). However, the proportion of factory workers who had work experience before their current job is slightly higher than that of home-based workers. We discovered that 46.1% of factory workers have work experience prior to their current job, while only 31.4% of home-based workers had worked before their current job. In contrast, both factory and piece-rate workers have similar characteristics in engagement in the OJT opportunity. Based on the findings, 37.1% of factory workers and 33.8% of home-based workers reported having OJT experience.

In terms of educational background, as shown in Table 2, there is no apparent difference between home-based workers and factory workers. Both groups have a variety of academic backgrounds. In general, while around a quarter of female workers did not attend formal schooling, more than 30% completed at least 10 years of education.

Table 1 Background information about participants by affiliation

Variable	Home-based worker (n=220)	Factory worker (n=205)
Gender (Female = 1) [a]	1.000	1.000
Age (year)	33.853	28.532
Number of family member	6.384	6.483
Family member in garment industry	3.170	2.710
Community type [b]	.830	.785
Economic level of household [c]	3.205	3.200
Age at first work (year)	18.931	19.813
Average monthly income (PKR)	8,277.778	20,679.350
Work hours/day	5.440	8.055
Work days/week	5.399	5.972

Source: Data from Skills and Knowledge for Youth Program assessment

a. 0 = male, 1 = female.

b. The community where participants reside in: 0 = Rural and semi-urban, 1 = Urban.

c. Aggregate factor scores of DVD/CD player, TV, cell phone, computer, internet, bank account, car, motorcycle, bicycle, and refrigerator/freezer.

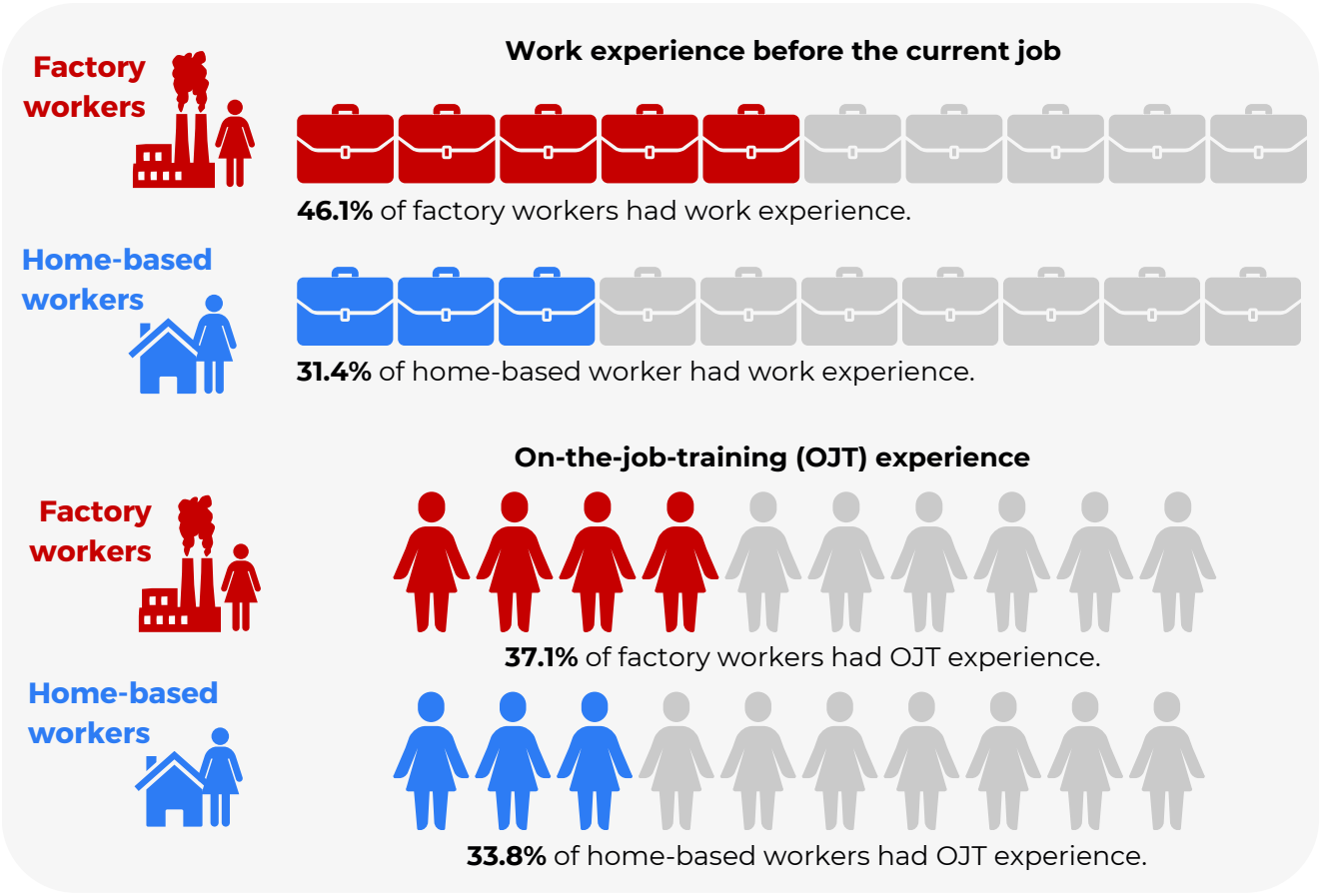


Figure 2. Participants' work and OJT experience by affiliation

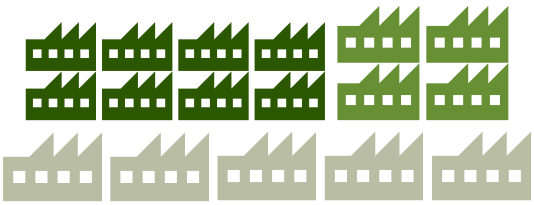
Table 2. Participants' percentage of attained education level by affiliation

Education level	Home-based worker (%)	Factory worker (%)
No formal schooling	23	28
Primary education (Grade 1 - 5)	23	16
Lower secondary education (Grade 6 - 8)	16	16
High school/Matric (Grade 9 - 10)	20	27
Intermediate/ F.A./ F.Sc	10	9
TVET	1	0
Tertiary (Diploma, BA/BSC, MA/MC, Ph.D.)	4	3
Other [a]	2	0

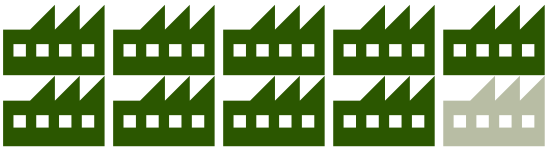
Source: Data from Skills and Knowledge for Youth Program assessment

a. [Other] refers to certification which cannot be categorized under the national education system.

The characteristics of participating firms. The firms consist of 8 smalls, 4 mediums, and 5 large firms. The firm size is categorized based on the number of employees defined by the Small and Medium Enterprises Development Authority (SMEDA) of Pakistan [2]. We found that more than 90% of firms provide On-Job-Training (OJT) to workers. The proportion of female employees in the firms enormously varies between 4% and 100%. On average, 4 out of 10 workers are female on average. Only 35% of companies reported that they collaborate with TVET institutions when they employ workers.



Participant Firms Consists of **8 Small**, **4 Medium**, and **5 Large** Firms



9 out of 10 Companies Offers OJT

35% of Companies Collaborate with TVET Institutions

On Average, **4 out of 10** Workers are Female

Figure 3. Characteristics of participating firms

[2] The definition of firm size based on the number of employees (SMEDA, 2018, as cited in Raza et al.,2018)
Small: Up to 35 people
Medium: 36-250 people
Large: More than 251 people

3 COMPARISON BETWEEN HOME-BASED AND FACTORY WORKERS

This section features a comparative analysis of workers who work at home and those who are employed in factories. From the time the SKY team was requested to conduct the survey, there was a shared assumption that there should be significant differences in the skills between home-based and factory workers. Therefore, the first step of our work was to check if this assumption is supported with evidence or not.

For this objective, we conducted a logistic analysis using a dummy variable that classifies the participants according to their employment status as the dependent variable. Logistic regression is a statistical technique employed to forecast the likelihood of a binary outcome based on one or more predictor variables. It is frequently used when the dependent variable is categorical and has only two potential outcomes, often referred to as 0 and 1 (Gudivada et al., 2016). In the case of our analysis here, factory workers are coded 1, and home-based workers are coded 0. The results of the logistic analysis are visually presented with the illustration in Figure 3.

Figure 4 contrasts home-based and factory workers according to their demography, job-related conditions, and the various types of skills they possess. The items listed at the left end of the figure are the predictor variables whose statistical relationship with the dependent variable (home-based worker or factory worker) is examined.

The bars stretching toward the left from the central point (with a negative value) indicate the probability that the increase of the concerned predictor variable by one unit happens with home-based workers. In contrast, the positive value in the figure signifies the probability that, when we find one unit of the concerned variable increases, the person is a factory worker. For example, if we randomly draw a person out of all the research participants, the probability that she is a home-based worker rises by 63.5% as her age increases by one year. Similarly, the longer the person's work hour is, the chance that a person is a factory worker becomes higher. An increase of one hour of work raises the chance that she is a factory worker by 40.5%. The lengths of the horizontal bars indicate the magnitude that respective independent variables covariate with the dependent variable (home-based vs. factory worker). An asterisk beside the value of each horizontal bar represents the significance level of a predictor variable's contribution to predicting the outcome. The number of asterisks (*), whether one, two, or three, indicates different levels of statistical significance. Specifically, one asterisk (*) signifies less than a 5% chance that the observed relationship between the concerned predictor and dependent variables is due to random chance, a two asterisk (**) signifies less than a 1% chance, and a three asterisk (***) signifies less than a 0.1% chance. The lower the chance that the relationship between variables is random, the likelihood that the variables are related to each other according to a consistent pattern. In other words, these asterisks suggest that we can confidently accept the existence of the relationship between the predictor and dependent variables at these levels of statistical significance.

3.1 Home-based workers are older and less paid, but their levels of skills are not much different from factory workers, except for practical skills

The outcomes of the logistic regression presented in Figure 4 show that individuals who are older tend to work at home, while those who earn a higher monthly income and work longer hours per day tend to work in factories. The findings are consistent with the study of Mahnaz Hassan & Azman (2014), which states that payments Pakistani female home-based workers receive are minimal, often lower than the official minimum wage standard, as labor laws are not applied to informal workers. Specifically, for every year of age, there is a 63.5% increase in the probability of being a home-based worker. Similarly, for every unit increase in monthly income, there is a roughly 29% increase in the probability of working in a factory. Lastly, for every additional hour worked per day, there is an approximately 40.5% increase in the probability of being a factory worker.

The shaded parts in Figure 4 are variables representing the skills of workers. The green-shaded part is practical skills, the grey-shaded part covers a variety of cognitive skills, while the blue shade indicates noncognitive (soft) skills.

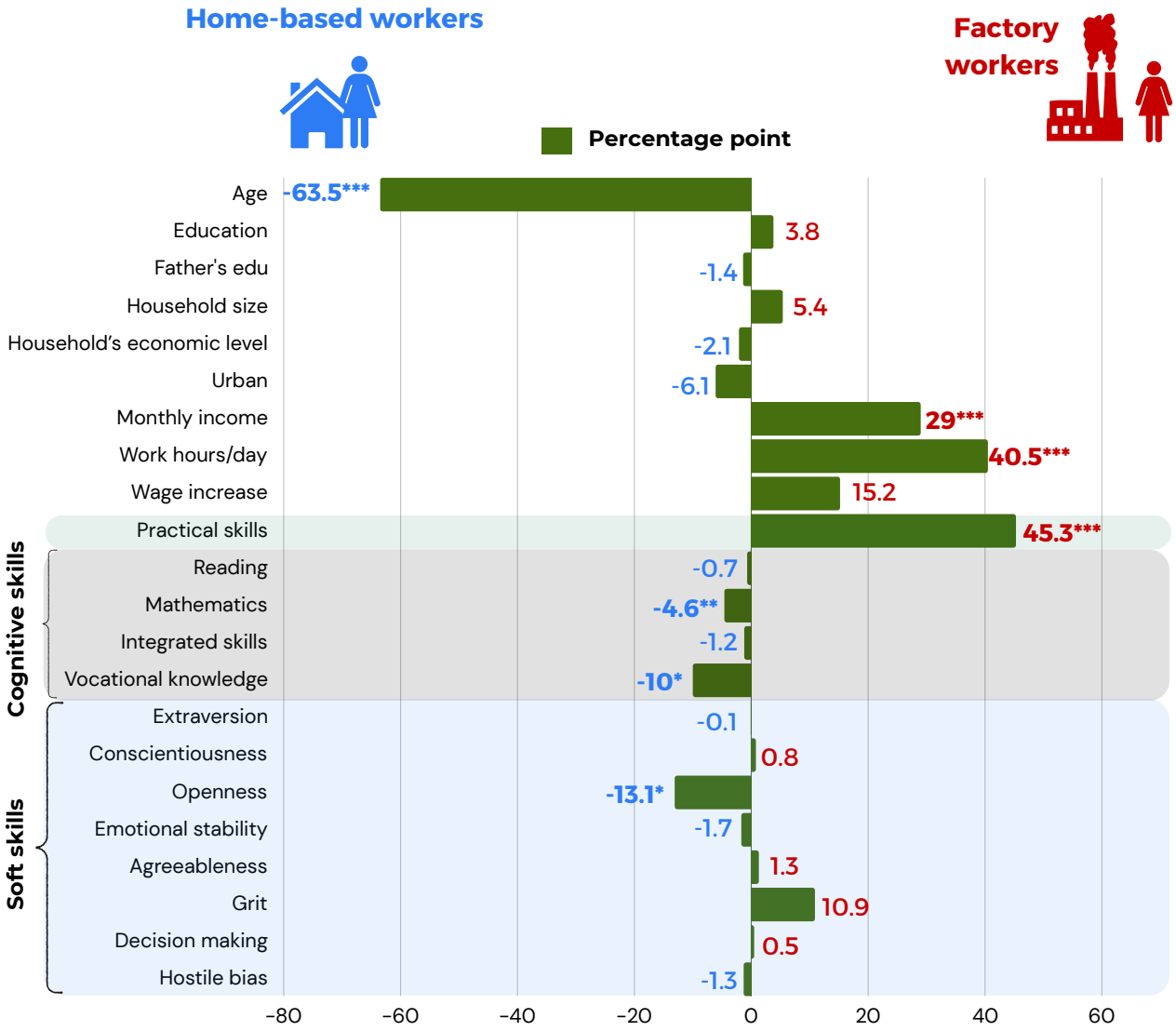


Figure 4. Comparison of home-based and factory workers' individual conditions and skills

Out of thirteen skills, most cognitive and soft skills are not significantly different between home-based and factory workers, except for practical skills, mathematics, vocational knowledge, and openness. Individuals with strong practical skills are more likely to be found among people who work in factories, while those with a solid foundation in mathematics, vocational knowledge, and a willingness to learn new things are more likely to work at home. Holding all other variables constant, each additional point in practical skills raises the probability of being a factory worker by roughly 43.5 percentage points. Conversely, each additional point in mathematics and vocational knowledge raises the probability of being a home-based worker by approximately 4.6 and 10 percentage points, respectively. Additionally, an increase of one point in openness raises the probability of being a home-based worker by approximately 13.1 percentage points. Regardless, compared to the clear contrasts identified regarding age, monthly income, and work hours, the differences in the skills composition between the two groups of workers are far less overt.

In order to verify our findings, we also conducted a standardized bias test using the propensity score. Standardized bias is a statistical method used to measure the difference in the means of the covariate between participant groups. It is often used to compare the magnitude of covariate imbalances across different covariates. The propensity score using logistic regression helps to determine whether or not the conditions of two participant groups are different by addressing balanced covariates between the groups (Stuart, 2010).

Figure 5 displays the standardized differences across covariates of respective predictor variables with the dependent variable (home-based vs. factory workers). A recommended cutoff for the acceptable absolute standardized bias is set at the level of 0.25. Larger standardized biases indicate that two groups of workers are too dissimilar (Stuart et al., 2013). A positive score indicates that the concerned predictor variable is more likely to describe the characteristics of factory workers, while a negative score signifies a higher association of the variable with home-based workers.

According to Figure 5, the predictors within the bias range of -25% and 25% (highlighted in yellow) show no difference between home-based and factory workers. The indicators which are dotted outside of this yellow box are few, which are age, monthly income, work hours, and experience of wage increase. In sum, these five factors can be considered to make home-based and factory workers different. The findings confirmed that among all types of skills, only practical skills demonstrate the difference between home-based workers and factory workers. Therefore, in general, there is no significant difference in most types of skills if we categorize workers by their employment status.

In academic studies, when the direct measure of workers' productivity is difficult, the indicators of practical skills are often used as their proxy. As the SKY research team has identified in different national contexts, the determinants of the skills that lead to higher productivity and labor market outcomes are highly context-dependent. Also, the investigation of such contextual determinants of workers' skills and productivity gives us nuanced pictures of the interaction

between workers' individual characteristics and their work environment (Kondo et al., 2021; Yamada, 2023). The analysis of this chapter shows that the practical skills, a proxy of productivity, are significantly different between home-based and factory workers. Such a difference in practical skills would also relate to the differences in salary and work hours. As we confirm that the workers' productivity seems to be determined more by the work environment than their capacities, we will now move to examine what aspect of the work environment matters for the workers' productivity.

To explain the variation of practical skills in more detail caused by the work environment, the next chapter will compare formal sector workers' practical skills across firms. One of the reasons for this focus on factory workers is that there are rich firm-provided data to be matched with those of their workers. As for home-based workers, no data from employers can be matched, which limits the possibility of a deeper analysis of them. As we confirmed that little difference exists between home-based and factory workers in terms of their inherent capacities, the investigation of factors affecting the performance of formal sector workers would give us insights that can also be applied to understanding the determinants of performance among home-based workers.

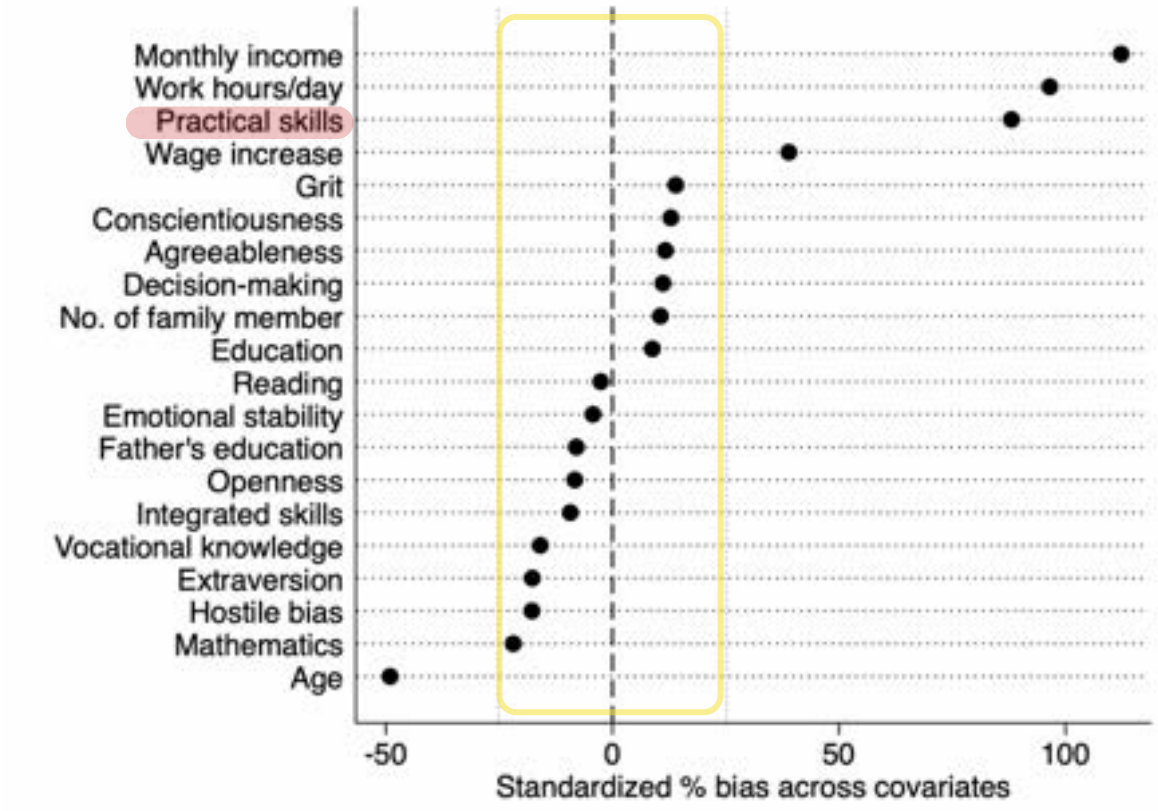


Figure 5. Standardized bias between home-based and factory workers' individual conditions and skills

4 FACTORS AFFECTING THE VARIATION OF FACTORY WORKERS' PRACTICAL SKILLS

In this section, we examine the factors that would explain the variations in the practical skills of female garment workers in Punjab, Pakistan, focusing on factory-based workers. Our analysis revealed significant differences in the practical skills among female garment workers depending on the firm they work in. Table 3 compares firms by the average skill levels of their workers. We categorized firms into three groups based on the ranking of their workers' average practical test performance (low, moderate, and high-skill) and conducted an ordered logistic regression to determine the factors that would most likely predict membership into those groups. Low-skill firms are in the bottom five, while the high-skill ones are in the top five firms in terms of workers' average practical skills. Out of 17 firms, thus, 7 firms were classified as moderate-skill firms. Low-skill firms have significantly lower average practical skill scores than the mean. In comparison, high-skill firms have average practical skill scores significantly higher than the overall mean. Since our study doesn't seek to single out firms with low-skilled workers and criticize them, the firms classified into respective groups will be kept anonymous. The names of the firms are not necessary for our aim to identify the factors that drive the increase in worker productivity and related skills.

Table 3. Comparison across firms based on workers' average skill level

VARIABLES	(1) Low-skill Firm	(2) Moderate-skill Firm	(3) High-skill Firm
Worker Variables			
Practical skills	-0.118**	0.003	0.115**
	(0.046)	(0.018)	(0.037)
Wage, in logs	-0.015	0.000	0.015
	(0.015)	(0.002)	(0.015)
Work hours per day, in logs	0.077	-0.002	-0.075
	(0.041)	(0.012)	(0.041)
Age, in logs	0.079	-0.002	-0.077
	(0.056)	(0.013)	(0.053)
Advice	0.046	-0.002	-0.045
	(0.047)	(0.008)	(0.044)
Growth mindset	-0.049**	0.001	0.048**
	(0.016)	(0.008)	(0.015)
Reading score	-0.023**	0.001	0.023**
	(0.008)	(0.004)	(0.008)
Mathematics	0.005	-0.000	-0.005
	(0.008)	(0.001)	(0.008)
Integrated skills	0.002	-0.000	-0.002
	(0.010)	(0.001)	(0.010)
Vocational knowledge	-0.007	0.000	0.007
	(0.020)	(0.002)	(0.019)
Education	0.031	-0.001	-0.030
	(0.033)	(0.005)	(0.032)
Openness	0.036*	-0.001	-0.035*
	(0.016)	(0.006)	(0.017)
Stability	-0.032*	0.001	0.031*
	(0.015)	(0.005)	(0.015)
Grit	-0.021	0.001	0.021
	(0.017)	(0.003)	(0.017)
Firm Variables			
Firm size	0.085***	-0.002	-0.082***
	(0.022)	(0.013)	(0.025)
Export firm	0.206***	-0.005	-0.201***
	(0.041)	(0.031)	(0.042)
OJT offering	-0.040***	0.001	0.039***
	(0.007)	(0.006)	(0.008)
TVET collaboration	0.131***	-0.003	-0.128***
	(0.037)	(0.020)	(0.039)
Diff: Punctuality	0.010	-0.000	-0.010
	(0.018)	(0.002)	(0.018)
Diff: Customer relations	-0.037	0.001	0.036
	(0.022)	(0.006)	(0.022)
Diff: Initiative	0.077***	-0.002	-0.075***
	(0.018)	(0.012)	(0.017)
Tidiness, punctuality, & collaboration	0.049	-0.001	-0.048
	(0.027)	(0.008)	(0.026)
Women stereotype	0.041**	-0.001	-0.040**
	(0.014)	(0.006)	(0.014)
Observations	205	205	205

Ordered logit on three categories of firms clustered based on workers' practical skill level.
Standard errors in parenthesis; *** p<.001, ** p<.01 * p<.05

Table 3 illustrates the marginal effects of each independent variable on the probability of being in each type of firm: low-skilled, moderate-skilled, or high-skilled firms. Unlike the coefficients in an ordered logistic model, the marginal effects are easier and more direct to interpret as they represent the probability of the targeted outcome for a unit change in the independent variable. For instance, if the marginal effect of "Practical skill" is .155 in the high-skilled firm column, it can be interpreted that for each additional practical skill score, the probability of workers being in a high-skilled firm increases by 15.5 percentage points, holding all predictors constant. Then, the statistical significance levels, one (*), two (**), and three asterisks (***), are included to respectively express that there is less than 5%, 1%, and 0.1% probability that the effect is due to random chance.

Table 3 lists independent variables of roughly two types. One is the items incorporated from the workers' questionnaire and represent characteristics of individual workers in three categories of firms. Workers' age ("Age, in logs"), monthly income ("Wage, in logs"), and hours they work in a day ("Work hours per day, in logs") are the results of converting original data using the log transformation to improve the normality of data distribution. We also include variables depicting whether participants graduated above the 9th grade ("Education") and whether they receive advice from supervisors or colleagues ("Advice"). As for participants' skills, practical skills, four domains of cognitive skills ("Mathematics", "Reading", "Integrated skills", and "Vocational knowledge"), and four types of soft skills ("Openness", "Emotional stability", "Grit", and "Growth mindset") were included in the analysis. The first three soft skills were personality traits we measured by a specialized psychometric scale, as explained in Chapter 2, while the growth mindset was constituted by a multiple-answer question asking participants' reasons for choosing their current jobs, using the statistical method called principal component analysis (PCA) [3]. The answer options capturing participants' eagerness to have self-confidence and receive skill development opportunities from working were grouped into a variable called "Growth mindset", which refers to one's belief that skills can be improved and aspiration to make an effort for improvement.

Regarding the workers' individual characteristics, putting aside the practical skills according to which the firms are classified and, thus, naturally indicates significance to the opposite direction, a soft skill to desire and make an effort for improvement ("Growth mindset"), cognitive abilities to read, soft skills to be open to learn new things ("Openness") and to be emotionally stable ("Stability") also showed the similar contrasts.

Another type of independent variable is the items from the firm managers' questionnaire, which provide information about the firms' business, provision of training for workers, and their perceptions about the necessary skills of workers to be effective and productive in their firms. The managers' expectations regarding workers' work-related soft skills are transformed into four variables: "Diff: Punctuality", "Diff: Customer relations", "Diff: Initiative", and "Tidiness, Punctuality, & Collaboration." The last variable, "Tidiness, Punctuality, & Collaboration", groups a set of questions that measure managers' perceptions of the importance of noncognitive skills,

[3] Principal component analysis (PCA) is a linear dimensionality reduction statistical method, which identifies patterns and commonalities of variables to reduce dimension in multivariate data (Shlens, 2014).

such as tidiness, punctuality, and teamwork skills, based on the results of PCA. On the other hand, the variables starting with "Diff" represent the difference in perceptions of specific work-related soft skills between the employees and managers. Positive values determine that managers value the skill more than workers.

For this particular survey in Punjab, Pakistan, the SKY research team added some question items about managers' perceptions of women and their involvement in productive work. This set of questions about managers' (employers') perceptions of women's strengths and weaknesses is clustered into the last variable in the table named "women stereotype", whose effects are opposite to low-skill and high-skill firms (For both categories, this variable demonstrates statistical significance with two asterisks but the covariance value for high-skill firms is negative and that for low skill firms is positive.

As for firm characteristics, it is not only with the "women stereotype" variable that the independent variables demonstrate significance to the opposition directions between high-skill and low-skill firms. The number of employees ("Firm size"), whether the firm exports the products or not ("Export firm"), the firm's variety of on-the-job training opportunities for workers ("OJT offering"), whether the firm collaborates with TVET institutions when they employ new workers ("TVET collaboration"), and whether the managers appreciate workers to take initiative at work ("Diff: Initiative") are significant but in contrasting ways between low-skilled and high-skilled firms.

In the following sections, we will discuss more in detail factors characterizing the workplaces which have higher average levels of workers' practical skills in comparison to those with lower average practical skills. Section 4.1 will focus on the individual workers' characteristics, particularly their cognitive and noncognitive skills. Section 4.2 will highlight the workplace conditions that either enable or discourage female workers from improving their skills and productivity.

4.1 High-skill firms tend to have workers with more motivation, emotional stability, and reading abilities

According to Table 3, certain factors contrast the three groups, particularly between the low-skill and high-skill firms. For the individual-level variables, both groups of firms demonstrate opposite tendencies in workers' practical skills, growth mindset, openness, emotional stability, and reading skills. These variables are with the asterisks (*, **, or ***), indicating the level of statistical significance.

According to Figure 6, visualization of skills predicting the membership to low- or high-skill firms, our analysis identified the key characteristics of high-skill firms, which have more workers with high practical skills and a desire to learn and improve ("Growth mindset"). We found that every one-point increase in the workers' growth mindset raises the probability that the firm she works for will be categorized into the high-skill group by 4.8%. Workers who enter the firm with a growth mindset believe that their practical skills can be developed through hard work, perseverance, and feedback from others (Dweck, 2016). Having such a desire for growth and

commitment motivates workers to do better at work, which in turn contributes to enhancing their productivity (Ng, 2018; Rhew et al., 2018). With regards to soft skills, firms whose workers are generally more emotionally stable (represented by the variable "Stability") tend to be found in the high-skill group. On the other hand, businesses that hire individuals with more open minds to learn new things (represented by variable "Openness") are less likely to fall into this group. Our research outcomes indicate that openness is the preferred soft skill for firms with low-skilled workers because eagerness to learn new things is a desirable trait for people who need upskilling (Bing and Lounsbury, 2000). As firms transit to high-skill firm status, emotional stability becomes the desired trait for workers, with openness taking a secondary role. A meta-analysis conducted by Judge and Bono (2001) shows that emotional stability (low tendency to neuroticism) is significantly correlated with job performance. Workers who possess high emotional stability remain calm, composed, and confident in stressful situations and are able to quickly adapt to changing situations in the workplace.

Figure 6. Soft skills which workers in Low-skill and High-skill firms have

Aside from soft skills, in firms where workers with higher practical skills are found, the workers also demonstrate higher reading abilities. Interestingly, even a small increase in a worker's reading ability (as measured by a point increase in their score) can boost the likelihood that their firm will be classified in the high-skill group by 2.3%. According to a study conducted by Lazar et al. (1998), there is a correlation between significant improvements in basic cognitive skills like reading and numeracy, and positive changes in workers' attitudes toward their jobs, self-esteem, and performance. Also, workers with strong reading skills are better equipped with the means to digest instructions in written forms and follow them. For example, in garment firms, stitching specifications and quality control guidelines are provided in writing, whose understanding will directly lead to effective production with fewer errors and defects.

4.2 High-skill firms give more various types of OJT, and their managers have more positive gender stereotype

Now, let us turn to the workplace-related variables that demonstrate statistical significance in explaining the firms' average levels of workers' practical skills in Table 3. At the firm level, firm size, exportation, provision of OJT, TVET collaboration, managers' appreciation of workers' initiative ("Diff: Initiative") and stereotypes toward women's characteristics establish a contrasting propensity between low- and high-skill firms.

Our analysis has yielded insightful results regarding workplace conditions that can affect both the practical and soft skills of female garment workers in Punjab, as visualized in Figure 7. Specifically, the variety of on-the-job training (OJT) offered, and the employer's perception of

female workers were identified as key predictors of high-skill firms. Companies often use OJT as a way to train their workers in new competencies. This approach involves workplace training where a supervisor, manager, or experienced employee provides guidance to the trainee. OJTs are designed to provide practical experience to workers and are highly contextualized as they are tailored to the specific needs of the firm.

According to our findings, each additional type of OJT opportunity is associated with a 3.9% increase in the likelihood of being a high-skill firm. Our study's findings are consistent with prior research that has established a positive correlation between on-the-job training (OJT) and job performance (Andri and Mandataris, 2023; Lin and Hsu, 2017; Thevanes and Dirojan, 2018; Toumahuw, 2022). This suggests that investing in a greater variety of OJT initiatives can yield significant benefits for both employees and employers, including improved job performance and outcomes. These results underscore the importance of continued investment in employee development and training programs to enhance workforce skills and productivity.

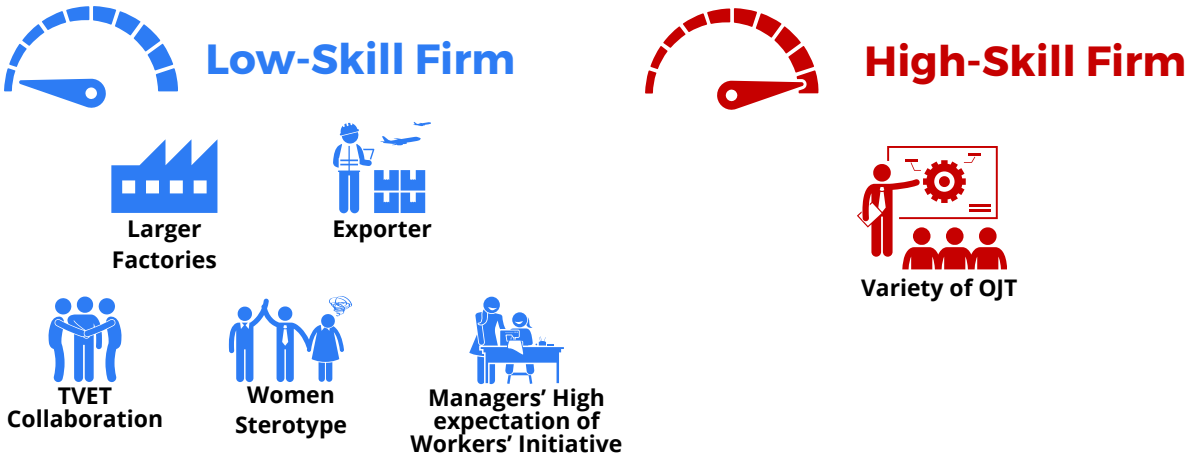


Figure 7. Workplace factors that predict membership to Low- and High-skill firms

In addition, as for the firm's conditions, we found that the firm size and whether they export their product (represented by the variable "Export firm") significantly predict the membership to low-skill or high-skill firms. Every level (including small, medium, and large) decrease in the firm size enhances the probability that the participant works in a high-skill firm by 8.2%. Likewise, the results indicate that being a domestic-oriented firm increases the likelihood of being a high-skilled firm by 20.1%. In SME firms, the production of a garment, such as a dress, is typically handled by one or a few workers. As a result, those employed at smaller firms tend to have more hands-on experience with a wider range of practical skills. In contrast, larger export-oriented factories often establish systematic production lines in which workers are assigned to specific sections and tasks, resulting in skill development in only one or a few practical abilities. With this insight, larger firms, especially export-oriented ones, could consider offering skill development programs that allow workers to have a broader range of practical skills.

Results of our analysis have also shown that the perspective of managers on women plays a crucial role in a company's productivity. Having managers who are biased can reduce the likelihood of their company being classified as a high-skill group by 4.0%. If managers hold onto

outdated and biased beliefs about women, such as assuming they are only suitable for part-time work or staying at home, it can negatively impact the development of a skilled workforce. The presence of workplace stereotypes often leads to employees experiencing anxiety related to their performance, which in turn hampers their ability to perform optimally and achieve their full potential (Kramer and Harris, 2016; Lavaysse and Probst, 2019). This result highlights the significance of creating a positive and inclusive workplace to improve the productivity of female garment workers.

Our research discovered that the difference in appreciation of proactive behaviors at the workplace between managers and workers significantly contributes to the likelihood of the participant being classified to work in high-skill firms. The marginal effect of the variable "Diff: Initiative" is -0.075, signifying that for every one-unit increase in the difference between managers' and workers' perception of workers' taking initiatives, the probability that the firm will be classified as a high-skill one decreases by 7.5%. In other words, if the managers' appreciation of workers' taking initiatives is consistently lower than that of their workers, the likelihood of the firm being categorized as a high-skill group increases. This means that the alignment between managers and female workers regarding proactive attitudes and behaviors at work is positively associated with firms' productivity. Rather than leaning on managers' high expectations of workers' taking initiatives, firms need to make sure that workers share a common appreciation of the skill.

To reduce the gap between workers and managers, firms may inspire and motivate their employees to see the importance of proactive behaviors and practice daily at the workplace. This could be done through the provision of training and the formation of an encouraging workplace environment with a culture of appreciating workers' initiatives. By fostering workers' initiatives, their problem-solving abilities, flexibility, communication, collaboration, and adaptability can be enhanced. For instance, employees who are encouraged to take the initiative and work collaboratively with their colleagues are more likely to develop better problem-solving skills. Additionally, employees who are empowered to make decisions are more likely to be adaptable and flexible in their approach to work. Ultimately, by addressing these areas, firms can improve the alignment between managers and workers regarding skill perceptions, ultimately enhancing the firm's productivity.

4.3 A Model of the Paths that Workers' Soft Skills and Workplace Conditions Contribute to Improved Practical Skills

As we identified that some types of soft skills and workplace conditions predict the high-skill firm membership, we have developed a model to delve deeper into the relationship between these factors. The goal is to determine how these factors improve the practical skills and productivity of female garment workers in Pakistan. Our findings are presented in Figure 8, showcasing a structural equation model (SEM) that illustrates how workplace conditions and soft skills impact practical skills. SEM is a statistical method which establishes a structural model, displaying causal relations and correlation between variables by using the covariance matrix of the relationship between variables (Byrne, 2016). Single-direction arrows demonstrate the causal relations of the variables 'Openness' and 'OJT offering' on 'Practical skills,' which is

the dependent variable. The value shown above the single-direction arrows shows the coefficient size. A negative value, such as the effect of firm size on practical skills, depicts that firm size inversely predicts workers' practical skills. On the other hand, double-headed curved arrows represent the correlation between variables, such as between 'Grit' and 'Emotional stability.'

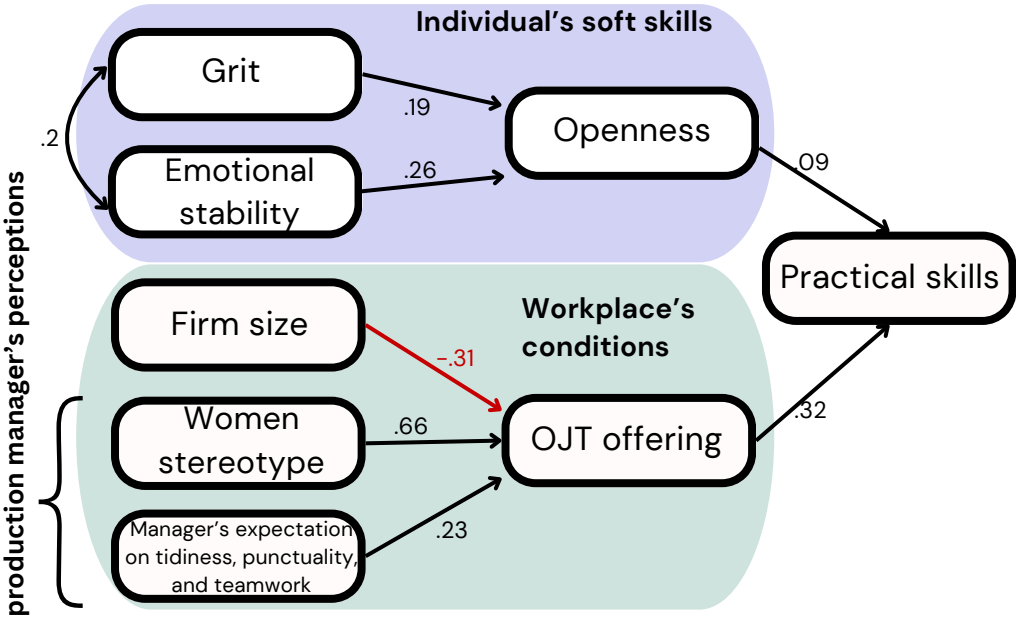


Figure 8. A Structural equation model of the contribution of workers' soft skills and workplace conditions to practical skills

As we previously discussed, emotional stability and openness are essential components that predict a company's overall skill level. It's important to recognize that these soft skills are interdependent, and the lack of one can adversely affect the effectiveness of others. Our SEM model has shown that workers' productivity is not determined by a single soft skill alone. Instead, a combination of soft skills is required to improve workers' practical skills. These results highlight the importance of comprehensive soft skills training to workers as different soft skills exhibit strong associations with each other.

In Section 4.2, we explore how workplace conditions impact a firm's skill level. The previous finding has shown that companies that offer more variaty of on-the-job training (OJT) tend to have highly skilled workers. Now, our SEM model has revealed that the perceptions and expectations of managers towards female employees play a significant role in the provision of OJT. Firms with managers who perceive women's characteristics more positively tend to provide more OJT opportunities. Managers invest more in skill development and training for female workers when they believe in women's abilities as equally as that of male workers. Likewise, although managers' expectations toward workers' tidiness, punctuality, and teamwork skills did not predict the membership of low- or high-productivity firms, it significantly affects the firms' provision of OJT. When managers highly perceive specific workplace-relevant soft skills, they tend to prioritize offering skill development programs for workers.

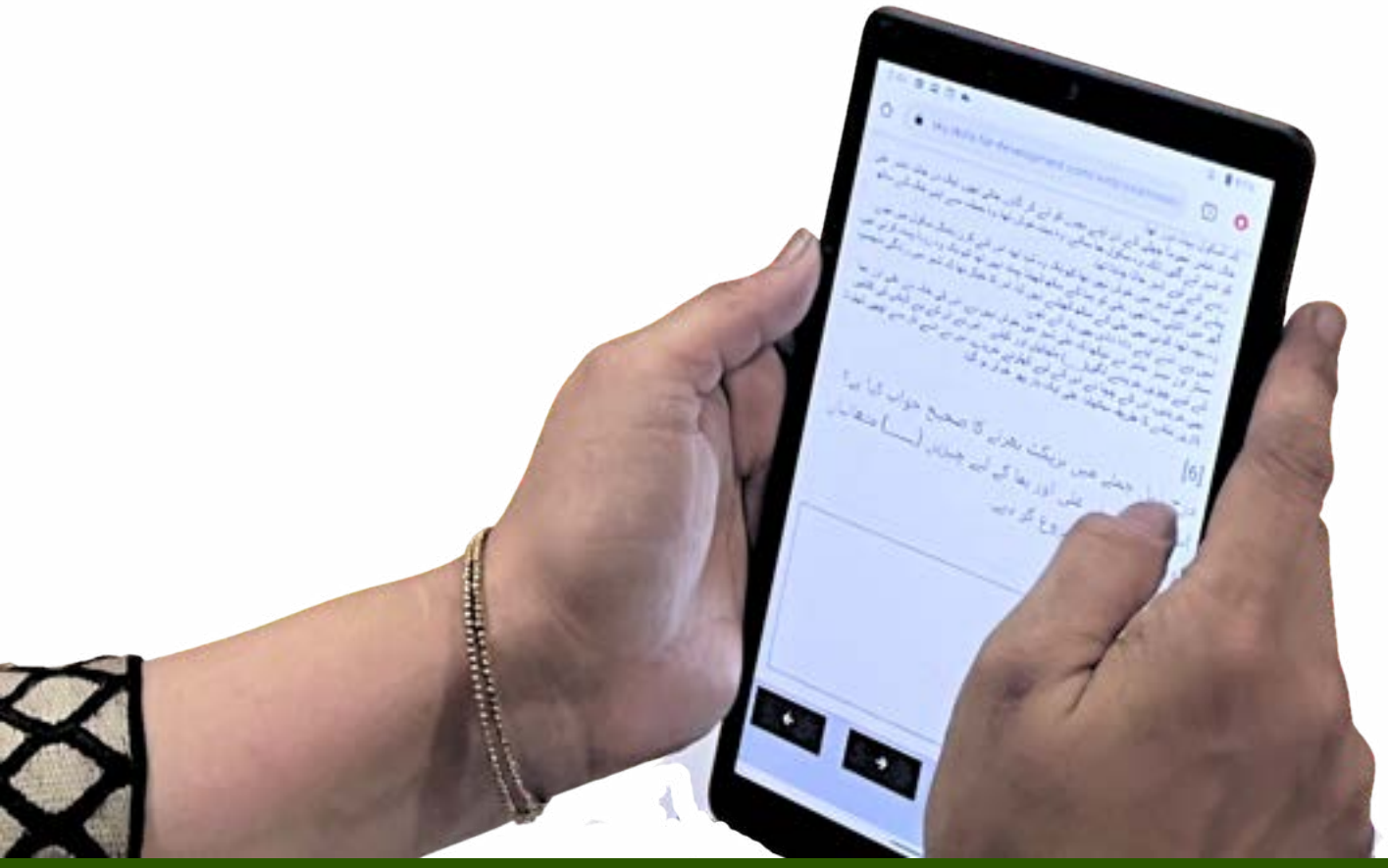
It is, therefore, essential to promote a positive stereotype of women among managers to ensure that female employees equally receive opportunities for training and development as their male counterparts. This will ultimately benefit the organization as a whole. Interestingly, we have

found that smaller firms are likely to provide more variety of OJT opportunities to their employees. Our results suggest that larger companies should follow suit and offer more OJT opportunities to improve their overall performance.

4.4 Summary

Key findings in this chapter highlight the influence of workers' soft skills and reading abilities on the probability of membership in high-productivity firms. At the firm level, the provision of OJT emerged as a significant predictor of high-skill firms, underlining the importance of consistent investment in a variety of OJT opportunities to enhance the firm's productivity. Moreover, production managers' perceptions of women played a critical role in promoting workers' practical skills. The managers' negative stereotypes are associated with firms classified as low-skill. This signifies the need for a gender-inclusive workplace environment to improve the productivity of female garment workers. Likewise, the alignment between managers' and workers' perceptions of proactive initiatives also is a driver of firm productivity, suggesting the importance of fostering positive mindsets toward initiative-taking behaviors among workers.

The study further investigates the relationship between soft skills and workplace conditions. The results reveal that workers' practical skills are influenced by workers' openness to learn new things and firms' provision of OJT. Soft skills such as grit and emotional stability are interconnected with openness, highlighting the need for comprehensive soft skills training. Additionally, the provision of OJT is influenced by managers' perceptions, including stereotypes toward women and expectations for worker behaviour, particularly tidiness, punctuality, and teamwork. Lastly, smaller firms are found to offer more variety of OJT opportunities, resulting in enhanced productivity. Large firms, thus, are encouraged to increase investments in OJT to enhance workforce productivity.



5 CURRICULUM ANALYSIS

5.1 Overviewed Curricula

In this section, we provide an overview of the curricula prepared by the Punjab Technical Education and Vocational Training Authority (P-TEVTA) and the Punjab Vocational Training Council (PVTC) to analyze which skills are emphasized during the training at TVET institutions.

The curricula employed by the TVET institutions under P-TEVTA are titled **Domestic Tailoring** and **Industrial Stitching Machine Operator**. Both of them are six-month courses. In addition, we have looked at two curricula used at the institutions under PVTC, which are **Dress Making** and **Industrial Garment Expert**. They are also six-month courses and are classified at Level 2 within the Pakistan National Vocational Qualification Framework (NVQF). NVQF is a national system of technical and vocational qualifications which was launched in March 2015. The criteria for NVQF Level 2 are as follows. The criteria show that NVQF Level 2 qualified worker has the basic knowledge and skills to work under indirect supervision and adapt his/her own abilities when solving problems.

> ***Knowledge and understanding***
> *Basic knowledge of readily available facts, processes and general theory of an area of work or study.*
>
> ***Skills***
> *Basic practical skills required to complete tasks and solve problems by selecting and applying basic methods, tools, materials and information.*
>
> ***Responsibility***
> *Take responsibility for prioritising and completing tasks in work or study under indirect supervision with some autonomy and adapt own abilities when solving problems.*
>
> (Source: NAVTTC, 2015 underlines added by the author)

Although the above four curricula are implemented by different TVET institutions, commonalities are observed among the industrial human resources they seek to develop. The **Industrial Garment Expert** curriculum prepared by PVTC aims to produce employable garment experts capable of operating various machines used in the garment industry according to national and international standards. The curriculum also expects the learners to go to higher levels of NVQF to become managers in the future. Similar objectives are outlined in the **Industrial Stitching Machine Operator** curriculum developed by P-TEVTA, designed for participants aspiring to work in the garment industry as stitchers or industrial stitching machine operators. Both curricula aim to cultivate garment machine operators in factories with specialized high-level sewing skills.

On the other hand, the **Dress Making** curriculum aims to provide skilled manpower to enhance the existing garment industry, enabling them to find employment as cutters, tailors, or checkers in factories or become self-employed. Similarly, the **Domestic Tailoring** curriculum also aims to prepare trainees for employment in garment factories, boutiques, or home-based settings. These two curricula place more emphasis on developing individuals with broader and basic garment knowledge and skills.

5.2 Skills emphasized in the curricula

This part examines the emphasized skills within each curriculum. Table 4 displays the skills outlined in the four curricula. A double-circle (◎) indicates the presence of specific sections dedicated to learning the skills, incorporating both theoretical understanding and practical application. There are some exceptional skills—calculation skills, for instance. Although there is no dedicated section for improving the calculation skills in the **Dress Making** curriculum, the skills are referenced in various other sections, such as "calculate fabric length and width" in the body measurement section and "estimate and calculate labor costs" in the stock management section. A circle (○) denotes skills not explicitly addressed in separate sections but seemingly integrated within others. For example, cutting, ironing, and calculations are not individually outlined in the Domestic Tailoring curriculum, yet they appear to be encompassed within sewing sections.

i) Practical skills

Regarding practical skills, the **Dress Making** and **Domestic Tailoring** curricula encompass a wider array of competencies, albeit more foundational and general in nature. Conversely, the **Industrial Garment Expert** and **Industrial Stitching Machine Operator** curricula prioritize possessing a higher level of "sewing" skills essential for operating various industrial garment machines effectively. These practical skills components appear tailored to align closely with the respective curricular objectives.

ii) Soft skills

There is a notable discrepancy in the treatment of soft skills and cognitive skills across institutions. PVTC places a greater emphasis on soft skills. For instance, within the **Dress Making** curriculum, there's a module titled "Develop Professionalism," which delves into aspects such as work ethic, punctuality, networking, and communication skills. Here, communication skills focus on fostering polite and transparent interactions with clients. Similarly, the **Industrial Garment Expert** curriculum includes a section on "Demonstrating Communication Skills," which emphasizes active listening, effective verbal and non-verbal communication, and confidence building. Notably, this curriculum underscores the importance of a friendly work environment in enhancing productivity, a concept uniquely highlighted. The curriculum also repeatedly mentions the importance of cleaning to maintain a safe workplace in each sewing machine operation section. The P-TEVTA's curricula also include "cleaning." However, it pertains not to overall workplace cleanliness and safety but rather to cleaning sewing machines to prevent malfunctions.

Table 4. List of skills mentioned in the curricula

	PVTC		PTEVTA	
	Dress Making	Industrial Garment Expert	Domestic Tailoring	Industrial Stitching Machine Operator
Vocational skills				
Designing	◎		◎	
Body measurement	◎			
Knowledge of fabric	◎		◎	
Knowledge of the shape of clothes parts			◎	
Pattern making	◎		◎	
Cutting	◎		○	
Sewing: knowledge of sewing machine parts	◎	◎	◎	◎
Sewing: maintenance of sewing machines	◎	◎	◎	◎
Sewing: basting	◎		○	
Sewing: sewing machine in general	◎		◎	
Sewing: single needle lock stitching machine		◎		◎
Sewing: chain stitch machine				◎
Sewing: double needle lock stitching machine		◎		
Sewing: over-lock stitching machine		◎		◎
Sewing: flat-lock chain stitching machine		◎		◎
Sewing: buttonhole machine				◎
Sewing: button Stitch machine				◎
Sewing: bartack machine				◎
Finishing: cropping		◎		
Finishing: hand stitching	◎		◎	
Finishing: embroidery and knitting lines				◎
Ironing: before and during sewing	◎		○	
Ironing: as finishing	◎	◎	○	◎
Inspection: after sewing	◎			
Inspection: as finishing	◎	◎		◎
Labelling & tagging	◎			
Packaging	◎	◎		
Stock management		◎		
Marketing	◎			
Soft skills (non-cognitive and behavioral skills)				
Health and Safety	◎	◎		
Work Environment	◎	◎		
Communication skills	◎	◎		
Behavioral skills	◎	◎		
Cognitive skills				
Calculations	◎		○	
Knowledge of computers			◎	◎
Microsoft Word			◎	◎
Emailing			◎	◎
Internet			◎	◎
English: Grammar			◎	◎
English: Writing/Reading			◎	◎
English: Speaking/Listening			◎	◎

◎: There are specific sections on how to learn the skills.
○: There is no specific section for the skills, but it seems to be included in the others.

iii) Cognitive skills

P-TEVTA's curricula feature modules that foster cognitive skills, particularly in IT and English language proficiency. Both the **Domestic Tailoring** and **Industrial Stitching Machine Operator** curricula have the same modules for those skills. The sections dedicated to IT skills are tailored for individuals to be able to use desktop PCs. Its content centers on guiding users through tasks such as document creation using Microsoft Word, setting up email accounts for computer-based communication, attaching documents to emails, and providing tips for effective internet searches. The sections for the English language skills cover grammar, writing, reading, speaking, and listening. Although the curriculum suggests using a textbook titled "High School English Grammar," the sections are more likely to be related to the workplace. For instance, the writing part of the section has the skit of "submitting a report of the performance of the team of technicians" and "Job application/C.V." PVTC's curricula do not have English sections. Still, the medium of instruction for the **Industrial Garment Expert** curriculum can be English, unlike the **Dress Making** curriculum, which is required to teach either Urdu or the local language.

5.3 Personality traits and behavioral skills in the curricula

Based on our team's findings in the previous sections, personality traits (openness, emotional stability, and grit) and behavioral skills (tidiness, punctuality, and teamwork) influence workers' practical skills both directly and indirectly. By simply observing the four curricula, it appears to lack dedicated sections for enhancing personality traits or acquiring behavioral skills. However, certain segments seem capable of fostering their development. This part gives some examples.

i) Personality traits

Personality traits encompass patterns of thoughts, feelings, and behaviors unique to individuals. Our team's analysis identified emotional stability, grit, and openness as pivotal traits enhancing workers' practical skills.

Within the "Develop Professionalism" segment of the **Dress Making** curriculum, stress management is highlighted. It potentially aids learners in bolstering their emotional stability. Similarly, the "Demonstrate Communication Skills" component in the **Industrial Garment Expert** curriculum focuses on fostering skills for creating a friendly workplace atmosphere, which can contribute to nurturing openness among participants. However, as these initiatives only offer the potential to enhance personality traits, instructors must be dedicated to fostering the improvement of students' abilities.

P-TEVTA's curricula appear to allocate ample individual project time, fostering grit by necessitating learners to initiate projects from scratch and crafting entire clothing pieces independently. What should be emphasized here is that the instructors must effectively draw out trainees' motivation and guide them through task completion. The English language learning module within P-TEVTA's curriculum advocates for discussions, interviews, and roleplay during classes. If instructors prioritize improving communication skills over learning language acquisition, this section could also serve to enhance various aspects of learners' personality traits.

ii) Behavioural skills

As the previous section elucidated, managers' expectations regarding workers' tidiness, punctuality, and teamwork skills significantly influence the provision of on-the-job training (OJT) in firms, thereby enhancing workers' practical skills.

Several sections of the curricula underscore the importance of tidiness. It is evident in curricula such as **Industrial Stitching Machine Operator** and **Industrial Garment Expert**, which stress the necessity of cleaning, oiling, and conducting basic maintenance on sewing machines. Additionally, PVTC's curricula contain sections titled "Follow Environmental, Health, and Safety Rules" and "Identify Hazards at Workplace," which can aid learners in improving their tidiness by emphasizing the importance of maintaining cleanliness throughout the workplace, not just focusing on machines.

Furthermore, teamwork is a recurrent theme across various sections of the curricula. For instance, the **Industrial Garment Expert** curriculum includes a segment titled "Demonstrate Communication Skills," designed to cultivate learners' abilities to foster a positive workplace atmosphere. However, due to the absence of specific measurement criteria and communication guidelines within the curriculum, instructors must rely on their discretion to teach communication skills effectively.

While the curricula don't have a dedicated section emphasizing punctuality, learners may still acquire time management skills by completing their individual projects or assignments by the deadlines. To meet deadlines, students need to create detailed work plans, thus requiring assistance from instructors. Moreover, the instructors' consistent adherence to class schedules can also contribute to this development.

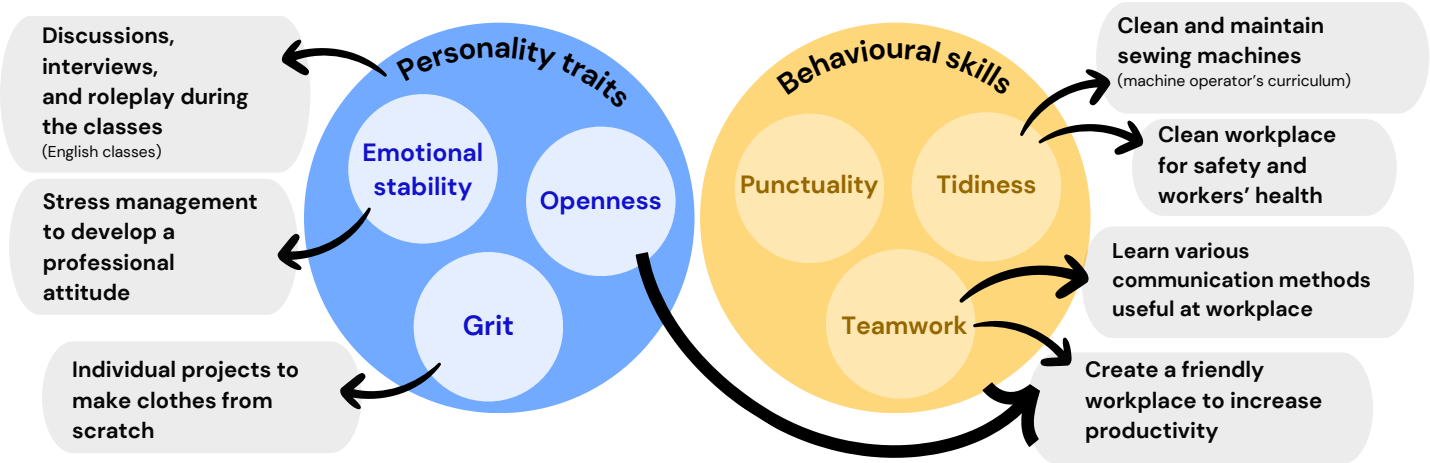


Figure 9. Personality traits and behavioral skills written in the curricula

6 CONCLUSION

6.1 Conclusion

In conclusion, the comparative study between home-based and factory workers through logistic regression analysis and a standardized bias test indicates the differences in individual conditions and skills between the two groups. For individual backgrounds, the age of home-based workers is likely higher than that of factory workers. In contrast, higher monthly income and longer work hours tend to be more associated with factory workers. In terms of skills, most cognitive and soft skills show no significant disparities between the two groups. Practical skills are the only skills that exhibited differences between home-based and factory workers.

Practical skills, often regarded as a measure of the workforce's productivity, vary between the two groups. Nevertheless, to understand the determinants of practical skills, we need a multifaceted analysis drawing the involvement of workplace and environmental factors. Therefore, the more in-depth analysis focuses on investigating factors contributing to variations in practical skills through comparisons across firms. Given the similarity in skills between home-based and factory workers, the subsequent analysis focuses solely on factory workers due to the richer availability of data at both individual and firm levels.

Based on an ordered logistic regression, the firms are categorized into three groups based on the average practical skills scores of their workforce: low, moderate, and high-skill firms. The high-skill firms exhibit markedly higher average practical skill scores than the overall mean, while low-skill firms display average scores significantly below the mean. The findings identify that workers' growth mindset, reading abilities, and emotional stability are the key factors encouraging membership in high-productivity firms. For the firm-level factor, the provision of On-the-Job Training (OJT) emerges as a significant predictor of high-skill firms, signifying the importance of regular investment in various types of OJT to improve the workforce's productivity.

Additionally, the perceptions of production managers toward women employees also play a crucial role in the organization's productivity. Managers' negative stereotypes toward women increase the likelihood of firms being classified as low-skill. This highlights the necessity of ensuring a gender-inclusive workplace environment to improve the productivity of female garment workers. Likewise, the alignment of managers' and workers' perceptions of workers' proactive initiatives at the workplace can advance the productivity of the firm. By addressing the perception gap through the cultivation of a positive mindset toward initiative-taking behaviors among workers and the creation of encouraging and supportive workplace' cultures, the firm average practical skills can be improved.

Furthermore, after understanding their contribution to workers' practical skills, we explore the relationship between soft skills and workplace conditions using structural equation modelling. Workers' practical skills are influenced by their openness and OJT. Openness is, at the same time, affected by other types of soft skills like grit and emotional stability, which are also closely linked. The findings indicate that soft skills training should be comprehensive due to the interconnection of different types of soft skills. Likewise, the provision of OJT significantly impacts practical skills; however, it is influenced by managers' perceptions, including stereotypes towards women and expectations for workers' behaviour. Promoting a positive impression of women among managers is vital to ensure equal opportunities for female employees to receive training and fair treatment. Lastly, we have found that smaller firms provide more variety of OJT opportunities, leading to better productivity. Thus, large firms are recommended to invest in OJT in more diverse types for the better productivity of their workforce.

The current TNA project discovers similarities in skills between home-based and factory workers, as well as the factors influencing the productivity of female garment workers in Punjab, drawing the importance of the firm context. By addressing these factors, firms can enhance their overall workforce's skills and productivity, contributing to the economic expansion and sustainability of the firm. At the same time, we offer suggestions for TVET curriculum improvement to fill the skill gaps and mismatches between the workforce demander and supplier sides.

6.2 Policy Implications and Recommendations

Based on the findings, three pillars of policy implications are compiled along with recommendations for enhancing the workplace-related skills of female garment workers in Punjab.

01 The importance of soft skills development is confirmed but contextual relevance is the key.

- ***Comprehensive Soft Skills Training Programs***: Emphasizing the interconnection between different types of soft skills and implementing soft skills training programs that cover a wide range of skills are crucial. This can include encouraging workers to develop attitude with openness, teamwork, emotional stability, and more.
    - In low-skill firms, openness to learning new things is crucial for skill acquisition.
    - Emotional stability becomes attractive as firms advance their workers to high-skill status.
- ***Fostering a Growth Mindset:*** Encouraging employees to develop a growth mindset can lead to increased productivity and innovation. The skill development can be achieved through offering regular On-the-Job-Training (OJT) with constructive feedback and recognizing workers' achievements in an environment where learning and development are cherished.
- ***Contextualized Soft Skills Training:*** Tailoring soft skills training programs according to the conditions, specific needs, and weaknesses/strengths of the firms can assist the progress of skills transfer and application in workers' daily lives at the workplace. The training can employ real-life scenarios, simulations, and case studies, which reflect the actual contexts of specific firms and industries.

02 Practical Training is as important as soft skills for better productivity.

We suggest emphasizing the importance of practical training alongside soft skills for enhanced productivity.

- **Targeted Programs for Low-Skill Firms:** Implementing focused skills development programs to improve workers' practical and reading skills.
- **Regular Upskilling for High-Skill Firms:** Continuously Investing in upskilling programs to ensure the maintenance and improvement of current levels of practical skills among their workforce.
- **Partnerships between firms and TVET:** Providing contextually relevant practical training opportunities for future workers through these partnerships.

03 A Positive Work Environment Enhances Female Workers' Productivity.

- **Sensitizing Employers to Take Approaches for Promoting Gender Equality and Diversity:**
  - Firms should not only address existing disparities but also actively cope with gender stereotypes and biases that may exist in the workplace. Initiatives such as awareness campaigns and gender sensitivity training programs for workers in managerial roles can help combat unconscious bias and create a more inclusive and comfortable environment where female employees feel safe, valued, and respected.
  - Adopting gender-neutral policies and practices, such as equal opportunities for advancement and equal treatment in promotion processes, can facilitate better support for gender equality within the firm.

- **Fostering Worker Initiative:** Firms and managers should empower workers to take initiative. This can have significant benefits for a firm's productivity. When employees are provided with the independence to make decisions and take ownership of their work, they become more engaged, motivated, and committed to achieving organizational goals. It also enhances workers' soft skills, such as problem-solving, adaptability, flexibility, communication and collaboration among colleagues.

By implementing these recommended policies, stakeholders can form a work environment and skills development that not only cultivates the workforce's productivity but also encourages non-cognitive abilities, including efficiency and innovation, throughout the organization. Consequently, this leads to an enhancement in organization-wide productivity and facilitates economic growth at both firm and national levels. By placing a focus on creating a positive work environment, advocating for gender equality and inclusivity, and promoting employee initiatives, firms can position themselves for sustainable prosperity in today's highly competitive business world.

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