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Research on the Present Shortage of Highly Skilled Workers in the Textile and Clothing Manufacturing Industry with Regard to Supporting the Firms Sector for Sustainable Development in Ethiopia

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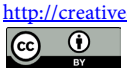

Abstract

The textile and clothing manufacturing industry is undergoing rapid technological advancements in areas such as digital sustainability. However, a shortage of high-skilled talent is emerging, particularly in areas like digitizing factories, improving supply chains, implementing resource efficiency strategies, and managing international markets. Workers must not only have traditional textile skills but also cross-sectorial knowledge to support emerging technical textile markets. Vocational education and training (TVET) systems are struggling to meet these demands. Curricula are outdated, focusing on discrete skills rather than holistic competencies, and assessments emphasize theoretical knowledge rather than practical problem-solving. Furthermore, teachers lack current digital and industry-specific expertise, exacerbating the talent gap. The industry's historical restructuring and job reductions have negatively affected its reputation, leading to fewer young people pursuing careers in textiles beyond design and distribution. This reduced interest in textile education worsens the talent pipeline, creating a cycle where the industry's needs outpace the supply of skilled workers. As a result, the growing demand for high-skilled talent in the face of technological advancements poses a significant challenge to the industry's future growth and innovation. The survey aimed to evaluate the effectiveness of industry integration with the Technical and Vocational Education and Training (TVET) system in Addis Ababa, Ethiopia, focusing on the balance between hard and soft skills in training programs. It was conducted across two polytechnic colleges (Entoto and Tegbare-id), and at Federal TVET institution, in

Bole Lemi Industry Park, and local enterprises. The survey targeted 518 participants, with a sample size of 226 respondents, including 105 TVET students, 36 teachers, 60 industry park technicians, and 25 enterprise technicians 68% male and 32% female respondents participated in this study. The survey assessed both hard skills (technical skills specific to job roles) and soft skills (a major gap encountered by industry technicians; the development of high-skilled talent is hindered by an outdated curriculum that does not align with industry requirements interpersonal, communication, problem-solving, and teamwork). The aim was to evaluate how well the current TVET system equips students with the competencies needed by industries and to identify any gaps in training for both technical and behavioral skills.

Subject Areas

Mechanical Engineering

Keywords

Talent Cultivation, Industry's Future, Vocational Education and Training, Sustainability, Digitalization

1. Introduction

In the 21st century, skilled talent is defined by a blend of mental and physical effort, incorporating a variety of skills necessary for performing complex tasks. Some skills where "talent" refers clearly to an individual's intrinsic abilities require motivation, focus, and experience. A major obstacle to promoting innovation, productivity, and growth in today's knowledge-based economy is the lack of highly trained workers, particularly technicians and trainers. The need for highly qualified individuals rises as sectors change, and training programs must adapt to meet these shifting demands. While TVET teachers would prefer to see a thorough understanding of textile manufacturing and overall performance, the study addressed the aspects of global professional ability training targets for high-skilled talents and attempted to develop a model for comparative advantage in the workplace [1].

The Ethiopian Occupational Standards for textile and clothing qualification, which serve as the basis of the teaching programs of the respective TVET institutions, are designed to meet the demands of diverse work contexts, from self-employment and microenterprises to formal export-oriented factories [2]. In the textile and clothing manufacturing sector, the development of high-skilled talent is hindered by an outdated curriculum that does not align with industry requirements. Collaboration between educational institutions and companies is insufficient, and vocational education often fails to address the holistic and practical skills needed in the workplace.

In Ethiopia, efforts are being made to reform the Technical and Vocational Education and Training (TVET) system to address these challenges. The government

aims to make Ethiopia a middle-income country by 2025/30, with a focus on training mid-level technicians. The reform of the TVET system emphasizes the need for industry involvement in designing and delivering training programs, ensuring that the skills taught align with market demands. This has led to the development of nearly 690 occupational standards, 380 curricula, and 545 assessment tools since the reform began in 2006. A key part of the reform has been shifting the focus of training from school-based instruction to enterprise-based practical training, or cooperative training (CT), which now accounts for 70% of the program.

According to Khurana (2018), the Ethiopian government has also prioritized the expansion of small and medium-sized enterprises (SMEs) in the textile sector, as they play a vital role in the country's economy. The textile industry employs a large portion of the population, particularly women, who make up 75% of the workforce in the sector. According to academic research studies, it is estimated that SMEs employ 22 per cent of the adult population in developing countries, and in Africa, SMEs play a momentous role in the macro economy [3].

The government makes considerable efforts for the expansion and growth of SMEs in this sector as they make a big contribution to the country's GDP, according to [4].

The Central Statistical Agency (CSA) and Ethiopian Textiles Industry Development Institute (ETIDI) have documented that 57,432 workers are employed in the textile and clothing manufacturing industry sector. [5].

According to [6], women comprise around 75 percent of employment in the sector, with a higher share in clothing than in textiles, and men occupy the majority of technical and management positions. Modernizing educational curricula, developing closer ties between industry and academia, and emphasizing hands-on, enterprise-based training are all necessary to solve the lack of qualified workers in the textile and clothing manufacturing sector.

2. Research Design and Methods

The study emphasizes the importance of clear presentation in research, particularly when integrating various components, such as data, study designs, and methodologies, to avoid confusion. It highlights the role of triangulation in enhancing the study's validity by crosschecking results through different approaches or perspectives, applicable in mixed-methods research, economics, design science, theory triangulation, and systems development.

The study concludes by demonstrating the practical application of mixed methodologies in real-world research through a multiple-case study inside a company [7]. The research is grounded in a mixed-methods approach based on pragmatism, combining both quantitative data (from surveys) and qualitative data (from semi-structured interviews), with the goal of merging these data types to provide comprehensive insights. Use the results [8].

The collected data further consolidated the theoretical foundation of vocational talent training and set a model theoretical framework. An analysis was conducted

on the TVET students' skills cultivation training mode in the textile and clothing industry technician. Analysis of the skills cultivation training mode in textile and clothing industry technician, the questionnaire evidence about skills empowerment practical ability of TVET students in Ethiopia, analysis of current curricula, respond to the student future skills needs, able to meet the needs of different textile and clothing manufacturing enterprises [9].

2.1. Population and Sample of the Study

The study involved 518 participants, including technicians from a local Ethiopian enterprise, workers from an industry park, participants from the Federal TVET Institute, and students from two polytechnic institutions. Respondents were selected based on their relevance to the study topic. The study employed purposive sampling for industry technicians and used a method commonly used in mixed methods and quantitative research. This approach was chosen for three main reasons: it allows the researcher to gather rich, detailed data directly related to the study's objectives, ensures the sample is highly representative of key characteristics, and is practical and efficient, especially for small-scale studies with limited sample sizes. Purposive sampling enables the collection of high-quality responses from fewer, more dedicated participants. [10].

In addition, it is a way to identify and choose cases that effectively utilize limited research resources [11]. Slovin's formula, which is frequently used to calculate sample sizes when working with a known population, was utilized to find the proper sample size for the study.

Slovin's formula is expressed as:

$$\boldsymbol{n} = \frac{N}{\left[1 + Ne^2\right]}$$

Slovin's formula

$$\boldsymbol{n} = \frac{N}{\left[1 + Ne^2\right]}$$

$$\boldsymbol{n} = \frac{518}{\left[1 + N(e)^2\right]}$$

$$\boldsymbol{n} = \frac{518}{\left[2.295\right]}$$

$$\boldsymbol{n} = 225.708$$

$$\boldsymbol{n} \approx 226$$

where:

$\boldsymbol{n}$ is the sample size;

$\boldsymbol{N}$ is the total population size (518 in this case);

$\boldsymbol{e}$ is the margin of error (usually expressed as a decimal, e.g., 0.05 for 5%).

A total of 226 respondents took part in this survey. A multi-step approach was used in the sampling operation to ensure a statistically representative sample. For the survey-based study, figuring out the right sample size was essential to obtaining

precise and accurate results. Supervisors of industry parks and enterprises, directors, trainees, purposively choosing technicians from the enterprise and Bole Industrial Park enabled the researcher to collect detailed, extensive data that was in line with the goals of the study.

2.2. Methods of Data Analysis

The data source required for this study to address the general and specific objectives is obtained from both primary and secondary sources. The primary source is obtained through close-ended Likert scale questionnaires, which were used as the measuring instrument. The Likert scale is a popular rating system that asks respondents to rate how much they agree or disagree with a sequence of statements or questions that were given to them, *i.e.*, from 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, and 5) Strongly Agree. The mean score was calculated by using the Likert scale value: Mean = (1 + 2 + 3 + 4)/4 = 10/4 = 2.5. Quantitative data analysis was performed using SPSS Version 27.0, focusing on the following measures: Finding out how frequently particular values or categories occur in a dataset is the goal of frequency analysis. The frequency of each category as a percentage of the total dataset is shown by percentages. By adding up all of the values and dividing by the total number of data points, the mean value is the dataset's average value and quantifies the standard deviation, the degree to which individual data points deviate from the mean by measuring the spread or dispersion of data points from the mean.

If the mean score for the given item was ≥2.5, it was considered the item important. Otherwise, it was considered not important. To calculate the overall importance, the value of all items was added and divided for the total number (226) of items. The questionnaire is one particular type of survey that asks for responses to a set of questions. A questionnaire can be used to engage a large number of individuals [12].

In this study, quantitative data was used to gather a survey questionnaire. Since it assists in establishing the validity and reliability of the questionnaire items through rigorous methods, the initial survey questionnaire was created in both English and Amharic, the native language. To make the survey questions, the Amharic version was given to industry park technicians and enterprise technicians, while the English version was given to TVET students and teachers. The study used a number of data collection tools, including questionnaires, interviews, and checklists, to get relevant data from key informants, including teachers from tertiary vocational institutes, Level IV polytechnic vocational students, and technicians in the high-end industry. In order to provide a balance of structured and qualitative replies, the questionnaire had both closed-ended and open-ended questions. To obtain additional information, a checklist for observation and document analysis was created in addition to the questionnaire. A review of appropriate literature, including books, journals, research papers, reports, and articles, was used to gather secondary data. This material, which came from the database or e-books of the Tianjin

University of Technology and Education School of Mechanical Engineering, helped to provide a thorough grasp of the subject of the research.

3. Results and Discussion

3.1. Vocational Education Theory Concept

According to [13], Constructivism is a learning theory that emphasizes the active role of learners in building their own understanding. Rather than passively receiving information, learners reflect on their experiences, create mental representations, and incorporate new knowledge into their schemas.

This promotes deeper learning and understanding. Constructivism is 'an approach to learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the learner' [14].

According to [15], John Dewey valued real-life contexts and problems as an educational experience. If students only passively perceive a problem and do not experience its consequences in a meaningful, emotional, and reflective way, they are unlikely to adapt and revise their habits or construct new habits or will only do so superficially. States cognitive development stems from social interactions from guided learning within the zone of proximal development as children and their partners' co-construct knowledge. According to [16], all knowledge is personal.

Each individual learner has a distinctive point of view based on existing knowledge and values. This means that the same lesson, teaching, or activity may result in different learning by each pupil, as his or her subjective interpretations differ. [17]. This principle appears to contradict the view that knowledge is socially constructed. Fox argues that although individuals have their own personal history of learning, nevertheless, they can share knowledge.

Although education is a social process powerfully influenced by cultural factors, cultures are made up of subcultures, even to the point of being composed of subcultures of individuals. Cultures and their knowledge base are constantly in the process of change, and the knowledge stored by individuals is not a rigid copy of some socially constructed template. In learning a culture, each child changes that culture. Learning exists in the mind.

According to [18], the constructivist theory posits that knowledge can only exist within the human mind and that it does not have to match any real-world reality. Learners will constantly try to develop their own individual mental models of the real world from their perceptions of that world. As they perceive each new experience, learners will continually update their own mental models to reflect the new information and will, therefore, construct their own interpretation of reality.

Cognitivist teaching methods focus on helping students integrate new information into their existing knowledge structures, modifying their intellectual framework as needed. Learning, according to this approach, occurs in two stages: first socially (inter-psychological), then individually (intra-psychological). Learners build new knowledge based on prior understanding.

The teacher makes sure he/she understands the students" pre-existing conceptions and guides the activity to address them and then build on them [19].

Scaffolding is a key feature of effective teaching, where the adult continually adjusts the level of his or her help in response to the learner's level of performance.

According to [20], in the classroom, scaffolding can include modelling a skill, providing hints or cues, and adapting material or activity. Constructivist teaching is based on constructivist learning theory. Constructivist teaching is based on the belief that learning occurs, as learners are actively involved in a process of meaning and knowledge construction as opposed to passively receiving information.

3.2. Re-Forms and Challenges of Skills Cultivation in the "Textile & Clothing" Manufacturing Sector of Ethiopia

The economic outlook and labor market in Ethiopia have been driven by an intensive public infrastructure program as well as strong service and agricultural sectors. Ethiopia has achieved one of the fastest economic expansions in sub-Saharan Africa, averaging 10.9 percent per year [21]. However, regardless of the general improvement in its economic state, Ethiopia faces challenges to its value-added manufacturing and job creation.

Manufacturing still represents only 4 percent of GDP, whereas the agriculture and service sectors together account for 90 percent. Unemployment has remained high, especially among young people in urban areas [22].

Given that enhanced importance is the major objective of the current TVET reform, it is natural that there is an upward dialogue about similar vocational training with industrial labor demands.

These ideas of competencies and importance are not used distinctively in terms of vocational education; rather, they are implanted in a wider dialogue expected to refine the role of education in developing problem-solving skills among 21st-century trainees facing the knowledge economy [23].

3.3. The Path to Enhance Future Skills of TVET Students in Ethiopia

Table 1 below summarizes that a large proportion of TVET instructors in the faculty of textile and clothing strongly expressed (58.3%) agreement with the construction of the research center, suggesting strong support for the initiative aimed at enhancing student talents and closing cognitive gaps. The following table summarizes the path to improve the future skills of TVET students in Ethiopia.

The majority of respondents (50%) have indifferent or disagreeing opinions about student cognitive gaps compared to the research center support. This indicates potential skepticism or lack of awareness about the existence of cognitive gaps among students. Only a small fraction (5.6%) strongly disagree that there are cognitive gaps, aligning with establishing a center of research to narrow the cognitive gaps of students, with the 5.6% who view addressing these gaps as less impactful. This minority reflects a potential outlier group whose views diverge notably from the majority trends.

Table 1. Route to enhance future skills of TVET students in Ethiopia.

Variables	Scale	Frequency	Percent	Valid Percent	Cumulative Percent
Construction of a Textile Mechanical and Electromechanical research center to enhance the talents	Disagree	3	8.3	8.3	8.3
	Neutral	12	33.3	33.3	41.7
	Agree	13	36.1	36.1	77.8
	Strongly agree	8	22.2	22.2	100
Student Cognitive Gaps	Strongly disagree	2	5.6	5.6	5.6
	Disagree	3	8.3	8.3	13.9
	Neutral	16	44.4	44.4	58.3
	Agree	13	36.1	36.1	94.4
	Strongly agree	2	5.6	5.6	100
	Total	36	100	100	

3.4. Infrastructure Development for Future Skill Nurturing

Table 2 below explains that TVET teachers' satisfaction towards course delivery, smart class (audiovisual equipment), and electronic books by qualification a significant majority of teachers hold a BSc degree (83.3%), suggesting that initiatives to improve satisfaction in course delivery could be tailored more towards those at this education level since they constitute the primary demographic.

Infrastructure for training satisfaction among TVET teachers and machine advancement in the training workshop, satisfaction levels regarding course delivery, and smart classroom technology are concerning, with 33.3% of teachers expressing dissatisfaction.

This indicates a clear need for improvements in either the infrastructure or how these tools are integrated into teaching.

Across curriculum integration with emerging technologies, neutrality, and mild agreement (68.5% cumulative for neutral and slight affirmation) dominate perceptions, suggesting either a satisfactory baseline with limited enthusiasm or a need for deeper engagement and training in utilizing these technologies effectively.

A substantial majority of TVET teachers surveyed (83.3%) hold a BSc Degree. This indicates a strong leaning towards undergraduate qualifications within this sample, with a minority (16.7%) having a Master's Degree.

In terms of satisfaction with course delivery using smart class tools, most teachers are either neutral (44.4%) or dissatisfied (33.3%), highlighting potential areas for improvement.

Teachers' views on curriculum integration with emerging technologies show varied opinions, with a dominant neutral stance (30.6%) suggesting both uncertainty and a potential gap in current provisions. However, the most utilized machine type is the SMI automatic machine, accounting for 52.2% of the total usage, significantly higher than others.

This suggests a preference for more technologically advanced equipment in vocational training workshops. Outdated machines still represent a prominent portion of usage at 41.7%, indicating a gap in fully upgrading to newer equipment. This could highlight areas for improvement in facility upgrades and training resources.

According to the data result, the decline in usage of programmable machines, at just 5.6%, highlights a potential gap in operator training or a mismatch in equipment availability that could affect workshop efficiency and the challenges of the future by making it agile and adaptable to changing a programmable machine was scared in most of textile and clothing sector except Federal TVET institute and few polytechnic colleges others are at null stage, most dominantly uses to conventional machine. (See Table 2)

Table 2. Infrastructure for training satisfaction among TVET towards course delivery and machine advancement.

Variables	Scale	Frequency	Percent	Valid Percent	Cumulative Percent
Qualification	BSc Degree	30	83.3	83.3	83.3
	Master Degree	6	16.7	16.7	100
Teachers' satisfaction with course delivery smart class (audiovisual equipment) and electronic books	Very Dissatisfied	4	11.1	11.1	11.1
	Dissatisfied	8	22.2	22.2	33.3
	Neutral	16	44.4	44.4	77.8
	Satisfied	8	22.2	22.2	100
Curriculum integration with emerging technologies(Mean)	1.7	2	5.6	5.6	5.6
	2	5	13.9	13.9	19.4
	2.7	8	22.2	22.2	41.7
	3	11	30.6	30.6	72.2
	3.3	6	16.7	16.7	88.9
	3.7	4	11.1	11.1	100
Outdated machine		15	41.7	41.7	41.7
SMI automatic machine		19	52.8	52.8	94.4
Programmable machine		2	5.6	5.6	100
Total		36	100	100	

3.5. Student Choice of Interest in Pursuing Careers in the Textile Field Area

Figure 1 indicates the respondents' perceptions and their opinions on the textiles and clothing course content as it relates to student skill development implications for Career readiness and a student's choice of interest in pursuing careers in the textile field area was in high demand for workers in the textile and apparel industry parks; the student had long expressed a lesser desire to work in the textile industry.

However, polytechnic colleges, including TVET colleges, do not recognize informal (short-term) training, which solely focuses on formal TVET education. This

suggests that the TVET training sector's skills did not match industrial demand. Because the textile industry requires very few engineers and high-end technicians, most employment in the industry requires middle- and lower-level labor-intensive training.

A significant portion (41.7%) of students express disagreement towards pursuing a career in the textile and clothing industry, while only a small fraction (5.6%) strongly support it. Neutral opinions are held by 13.9% of the students, indicating a level of indecision or apathy towards the field. Overall, there is a marked inclination against the field, with more than half of the students (50%) displaying negative sentiments.

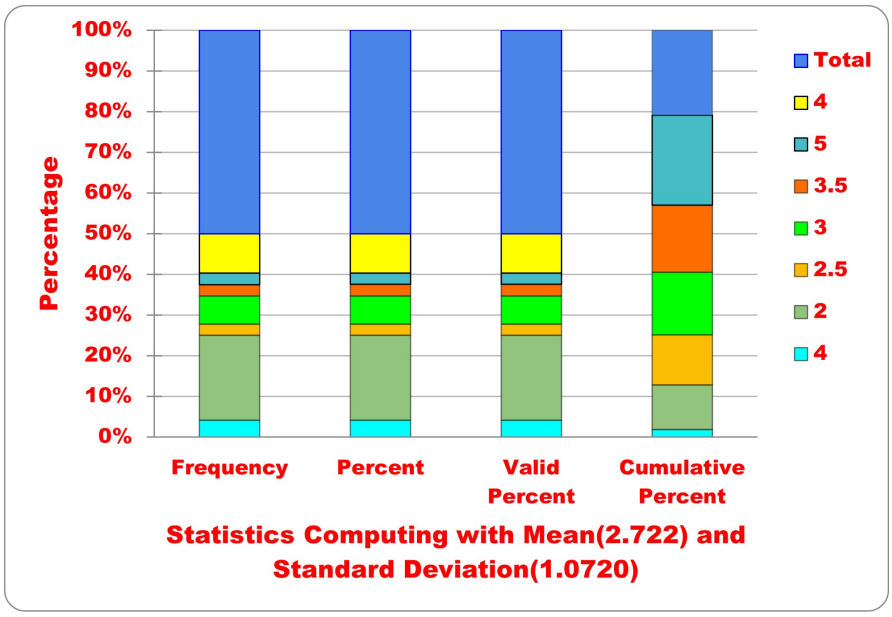

Figure 1. Implications for professional readiness of students' choices to pursue a career in the textiles field area.

Figure 1 suggests that interest in pursuing textile careers significantly dropped to showing minimal interest. This indicates a majority of respondents towards moderate interest.

The mean (2.722) indicates the data's central tendency. Students' interest in the textile business is scored at about 2.722 on average (probably on a scale of 1 to 5, but double-check if necessary). The standard deviation (1.0585) indicates the degree to which individual responses differ from the mean level of interest.

While a bigger standard deviation denotes more variability, a smaller one would suggest that students' replies are closer to the mean. Variance (1.120): The Square of the standard deviation is used to compute this additional spread metric. Though less obvious than the standard deviation, it also shows the range of pupils' interest levels. Range (4): The greatest variation in pupils' degrees of interest.

A range of 4 indicates that replies cover the whole scale, for instance, if the scale runs from 1 (low interest) to 5 (great interest). The dataset shows that all 360 data

points are valid, indicating a complete set for analysis, with no missing values affecting the results.

The average student interest rate in the textile and clothing sector is somewhat modest at 2.72, indicating a moderate or weak level of enthusiasm. This suggests that there may be difficulties in luring students to this industry. The lack of missing data validates consistent data collection, offering a comprehensive and solid basis for research, even when the interest levels span a wide range of 4.0.

3.6. There is a Need to Improve Occupational Standards (OS)

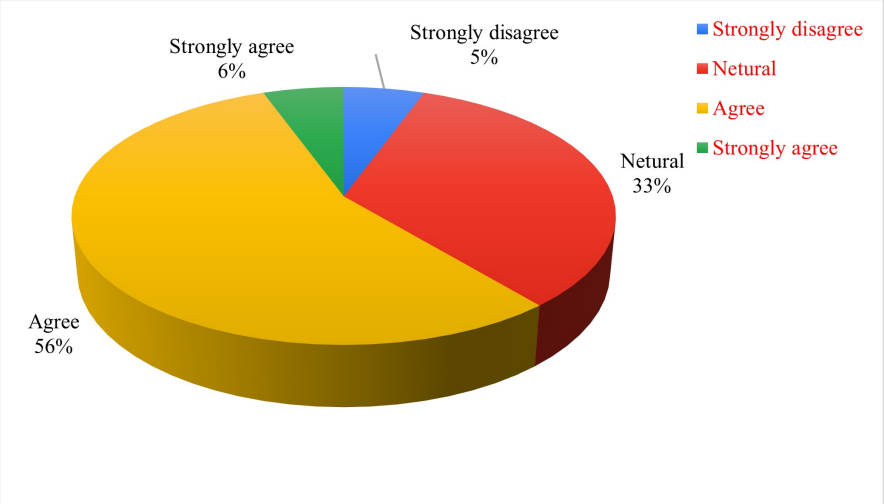

Figure 2. Ethiopian Polytechnic College and the federal TVET institute need to improve Occupational Standards (OS).

The graph in **Figure 2** displays a pronounced skew towards agreement, with 55.6% of responders selecting "agree," and the data shows a clear bias towards agreement. There is broad agreement on existing occupational standards, as seen by the fact that this category is far higher than any other.

The minimal cumulative increase between 'agree' and 'Strongly agree' suggests that while most respondents agree, few express strong agreement, possibly pointing to areas for further engagement or improvement.

There is a notable polarization between 'Strongly disagree' and 'Strongly agree,' both at 5.6%. This polarization indicates a small group of respondents holding firm but differing views from the majority, which could be explored to understand underlying concerns or motivations.

3.7. Modern Adaptations of Digital Literacy

According to the statistics, workflows have changed significantly because of technological improvements. The fact that 41% of participants frequently alter their workflows suggests that flexibility is becoming crucial in today's workplace. 56.2% of respondents expressed concern or strong concern about hiring practices' apparent

preference for technical abilities, indicating that technical-focused vocational training may become more and more valuable.

The relatively low concern (13.3%) among companies about hiring technically skilled employees indicates a minority that may underestimate the importance of technical competency, potentially flagging a disconnect in workforce preparedness.

Table 3 suggests potential areas for development in stress management courses or interventions. Emotional appreciation and understanding of differences demonstrate a balanced spread, but 48.6% have inconsistent exposure ('sometimes') to these attributes, highlighting opportunities for targeted emotive communication training.

Adaptive thinking is the capacity to create and adapt to the changing digital environment while comprehending cutting-edge technology such as virtual reality, blockchain, and artificial intelligence. Design thinking is a human-centered method of solving digital problems that combines brainstorming, empathy, testing, and prototyping.

Technological change is often integrated into workflows, with 41% of respondents frequently adapting, indicating strong alignment with tech advancements. Hiring trends show a strong concern (41%) for technical competencies among vocational students, highlighting the importance placed on skills in this sector. Overall, these findings underscore a significant shift towards digital adaptability and skills-oriented hiring practices in today's workplace.

Table 3. Digital problem-solving and innovation.

Variables	Scale	Frequency	Percent	Valid Percent	Cumulative Percent
Workflows change as technology develops	Never	5	4.8	4.8	4.8
	Rarely	14	13.3	13.3	18.1
	Sometimes	31	29.5	29.5	47.6
	Often	43	41	41	88.6
	Always	12	11.4	11.4	100
Companies tend to hire technically competent vocational student	Highly unconcerned	4	3.8	3.8	3.8
	Unconcerned	10	9.5	9.5	13.3
	Neutral	32	30.5	30.5	43.8
	Concerned	43	41	41	84.8
	Highly concerned	16	15.2	15.2	100
	Total	105	100	100	

3.8. The Shortage of High-End Technicians in the Textile and Clothing Manufacturing Industry

Figure 3 reveals a clear consensus within the textile industry regarding the shortage of high-end technicians, with the following key findings: high agreement

on technician shortage (67%): A significant majority (67%) of respondents agree or strongly agree that there is a shortage of skilled technicians in the industry. This indicates a widespread recognition of the issue and underscores the need for action to address it. Minimal disagreement (9%): Only 9% of respondents disagree with the notion of a technician shortage, suggesting that the issue is broadly accepted, though some may not experience it directly or may work in roles where it is less visible. Neutral responses (32%): around 32% of responses were neutral, reflecting uncertainty or lack of direct experience with the issue. This group may not be directly involved in hiring or training or may not yet feel the impact of the shortage.

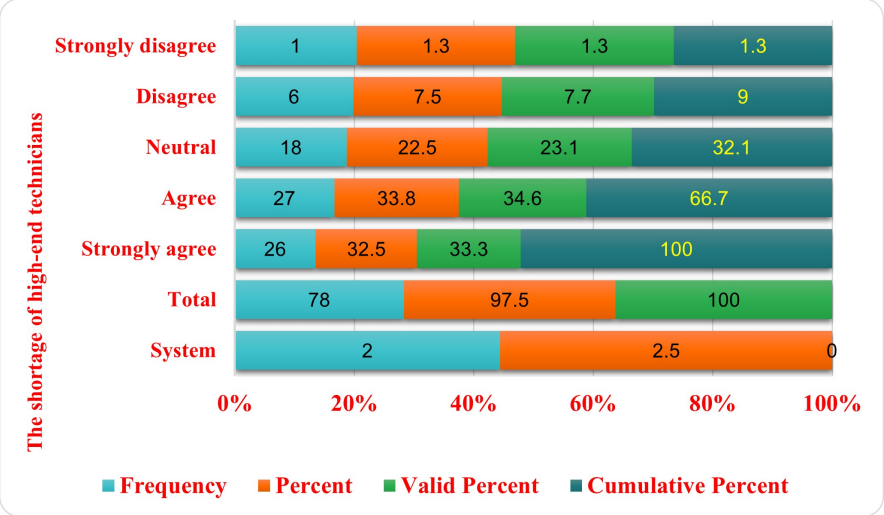

Figure 3. The shortage of high-end technicians in the textile and clothing manufacturing industry.

Interpretation & Implications, Widespread Consensus, and the majority agreement indicate that the shortage of skilled technicians is a significant concern, likely caused by factors like inadequate training programs, limited talent pools, and competition for skilled workers. Systemic Challenges: The low disagreement percentage supports the view that the shortage is a systemic issue across the industry rather than isolated cases and points to deeper challenges such as insufficient workforce development and outdated educational curricula. Focus on Addressing the Gap: The recognition of the shortage by most respondents suggests a need for targeted interventions, including recruitment, upskilling, and partnerships between businesses and educational institutions.

3.9. A Major Gap Encountered by Industry Technicians

Table 4 provides insights into a significant trend where a majority of industry technicians feel neutral about the gap in their industry, making up 40% of responses. 21.3% of technicians disagreed with the notion of a major gap, while a combined 37.5% either agree or strongly agree, indicating a substantial concern.

Only 1.3% strongly disagreed, showing minimal controversy over the existence of gaps in industry practices.

The fact that 37.5% of respondents agree or strongly agree with the presence of a gap suggests that a significant portion of technicians see it as a real issue. This group could provide useful insights into the nature and potential causes of the gap, and their feedback might be crucial for industry reforms or improvements. The wide range of responses could point to differences in how technicians experience their roles. Some might be in positions where they face the gap directly, while others may not encounter it as frequently. Perception vs. Reality: The gap might be seen differently based on the individual's perception, perhaps shaped by their personal or professional background. Uncertainty: The neutral responses could reflect uncertainty or a lack of detailed information about the gap, possibly because technicians are still gathering insights or have not encountered the issue in a way that demands action.

Table 4. A major gap encountered by industry technicians.

Scale	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly disagree	1	1.3	1.3	1.3
Disagree	17	21.3	21.3	22.5
Neutral	32	40.0	40.0	62.5
Agree	16	20.0	20.0	82.5
Strongly agree	14	17.5	17.5	100.0
Total	80	100.0	100.0	

4. Conclusion

Ethiopia's textile and clothing manufacturing sector has a lot of potential to promote economic development in the future. Nevertheless, achieving this potential requires resolving the scarcity of highly qualified personnel. Closing the skills gap requires investing in sustainable manufacturing technology, enhancing education and training infrastructures, and matching training curricula with industry demands. By tackling these issues, Ethiopia can produce a highly qualified labor force that promotes the expansion and sustainability of the textile industry.

5. Recommendation

- Government Incentives for Skills Development: Tax exemptions, grants, or subsidies may be available to textile companies that invest in employee training.
- Support for new and growing textile companies: many small and medium-sized textile companies do not have the funds to invest in training or technology.
- Track Development and Impact: Create a nationwide organization to supervise the execution of these programs, evaluate their influence on skill enhancement,

and track the advancement of the textile sector.

- Ethiopia's Economic Potential: Ethiopia can achieve long-term economic growth by resolving the skilled labor deficit in the textile industry. Investing in sustainable technologies, enhancing educational and training systems, bringing them into line with industry demands, and assisting with employee recruitment and retention are important steps.
- Innovation Hubs: Create centers of excellence or innovation hubs devoted to design, production, logistical breakthroughs, and sustainable textile production.
- Industry-Academic Partnerships: Boost cooperation between technical training facilities and the textile sector. Establishing specialized training facilities or "industry-led academies" that provide both theoretical and practical instruction may be one way to achieve this. For instance, industrial areas like Hawassa Industrial Park might include academies with a concentration in textiles.
- Internships and Apprenticeships: Develop or grow internship and apprenticeship programs that give students practical experience in textile manufacturers. With assurances of job placements or chances for career growth for graduates, these programs ought to be designed to entice companies.
- Curriculum reform: To meet the present and future demands of the textile industry, work with industry experts to update vocational and technical education curricula by incorporating digital technologies (such as CAD and 3D printing), advanced manufacturing techniques, and sustainable practices (such as eco-friendly dyeing and waste reduction).
- Enhance Soft Skills and Leadership Development: Investing in soft skills such as problem-solving, teamwork, and leadership is essential for creating a well-rounded staff that can manage and innovate in a sector that is changing quickly, in addition to technical expertise.

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this research.

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