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The State of the Industrial Workforce in Tigray: Binding Constraints and Potential Solutions

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Abstract

Currently, the industrial sector particularly the manufacturing sector in Ethiopia including the Tigray region is characterized by low productivity, high labor turnover, skill-mismatch, and recently semi-skilled labor shortage. Mega-industrial parks such as Mekelle industrial park, Raya valley agro-processing andHumera agro-processing are being built in earnest in Tigray as corridorsof priority. This will lead to the massive demand of trained and trainable workforce. Hence, to attract, retain and expand the manufacturing sector and remain competitive, a motivated and productive industrial workforce is indispensable. For example, the Hawassa industrial park currently requires 1,000 workers every week, but manages to get only half of them. Moreover, about 250 workers leave the factoriesevery week. This shows the extent of the challenge ahead the industrial parks in Tigray would face. Valuable data were collected from relevant bodies and sectors in Tigray and analysed to substantiate the actual status. This article, therefore, presents current binding constraints of the industrial labor market and suggests possible solutions. Implied from the identified binding constraints, priority solutions such as implementing impactful packages for attitudinal change, demand driven skill development, University/TVET-Industry linkage, workforce database management, genuine industrial relations, labour welfare, and dedicated institution for workforce coordination are recommended.

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Key words: Workforce; Industry; Labor market; Manufacturing; Tigray

1. Introduction

To achieve a successful structural transformation that leads to a robust economic growth, significant poverty reduction and living standards improvement, a well-functioning labor market is necessary. This is the very reason why many countries, especially the already developed and the fast growing economies, are highly determined to repeatedly study and take measures on aspects related to workforce [1]–[10]. A functioning labor market is envisaged to offer gainful employment for employees and equips the necessary technical and soft skills to enhance productivity and competitiveness of the manufacturing sector. Increase in firm productivity is one of the key factors that determine long-term economic growth. About half of the global economic growth is driven by improvements in productivity rather than just factor accumulation, according to 2015 world bank report [11].

Availability of adequately trained and trainable workforce is necessary for enhancing export, attracting FDI (Foreign Direct Investment), and expansion and growth of domestic firms. The terms trained and trainable refer that the former implies for a person trained for specific skill or expertize and the later implies a person took basic training which makes him/her catch the specific expertize easily. Due to lack of the necessary experience and capacity to train workforce in-house, the availability of trained workforce is especially importantfor domestic firms to stay competitive and thrive. The ability to capitalize on a large pool of trainable workforce that enabled firms to improve productivity while maintaining low production costs was a major factor behind the success of East Asian Tigers in attracting FDI [11]. Studies show that the productivity gaps between firms in Ethiopia and China can be explained by the workforce in Ethiopia being less educated and poorly equipped than that of China [12].

Currently, the industrial sector particularly the manufacturing sector in Ethiopia is characterized by low productivity, high labor turnover, skill-mismatch, and recently semi-skilled labor shortage[11, 13]. Several studies have shown that productivity growth in the manufacturing sector has not matched wage growth [13]. As real wage growth has surpassed labor productivity

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growth, initial wage advantage that the country hascan be eroded by slow growth in productivity. This shows an intervention point to the labour welfare issues.

Mega industrial parks such as Mekelle industrial park, Raya valley agro-processing, Humera agro-processing are being built that, obviously, will imply the need of immense, highly motivated, trained and trainable workforce. As per the World Bank's report for Ethiopian skill module survey (2013) shown in Table 1 [14], "about 43 per cent of the sampled firms indicate difficulty of finding workers with essential ethics and commitment attributes." Twenty seven firms among the one hundred two (102) reported as they have vacancy. Reportedly, "about 67 per cent of them (18 firms) the vacant positions were unfilled for more than four months". Twenty one (21) firms provided reason for not addressing the vacancies, out of them 12 (57%) mentioned that lack of applicants while 8 (38%) reported scarcity of adequately qualified applicants.

Table 1: "Degree of difficulty to find workers with the specific skill attributes[14]"

	Proportions with degree of difficulty			
Attributes	Easy to find (%)	Neither easy nor difficult (%)	Difficult to find (%)	Total
Ethics and Commitment	23.81	33.33	42.86	100
Computer Skills	33.87	38.71	27.42	100
Technical Skills	23.81	30.16	46.03	100

Another key challenge is that the provision of on-the-job training by firms is limited (Figure 1). "About a third of the firms surveyed in World Bank's Ethiopia Skills Module report providing formal training to permanent workers. About half (47%) of the 68 firms that did not provide formal training mention that they did not require. The rest 24% and 29% cite high cost and unavailability of training programs /trainers as reasons for not providing training as shown in Figure 1."

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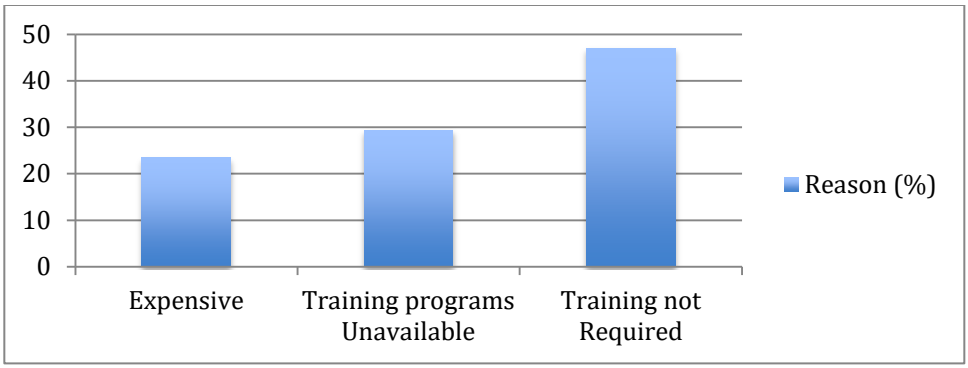

Figure 1: "Reasons for not providing formal training to workers[14]"

According to the 2015 Enterprise survey [11], firms in Tigray were the least likely to provide formal training to their workers with only 3.2% of the firms providing training compared to more than 20% in Addis Ababa and Amhara regions (Figure 2). In the face of high labor turnover, the incentives for firms to provide formal training to workers are low.

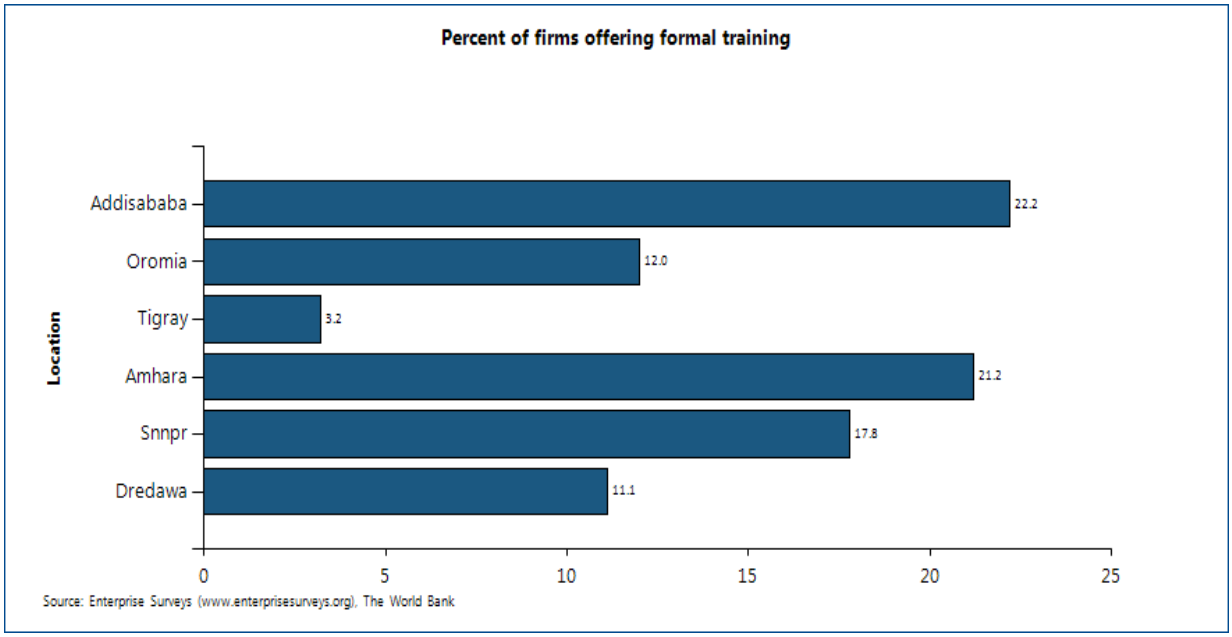

Figure 2: Firms offering formal training [11].

In summary, the current situation of the labour market in Tigray particularly of industrial labour requires a special attention to enable to produce a motivated, productive, and stable workforce.

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Identification of key constraints through standard approaches and placing expert recommendations to solve them, therefore, are inevitable.

2. Methodology

The main methods employed to conduct this research are primary data collection through questionnaires, KII (Key Informant Interview), FGD (Focused Group Discussion) and secondary data collection through literature review and from Government offices. Research team discussion and holding continuous intellectual workshops were also imperative methods used. The interviews and discussions are made on case-by-case basis and the numberof people asked for each case is presented in the results and discussions section. Researchers followed the stated well established research approaches. Major part of the assessment work was made through researchers' practical exposure and rigorous investigations.

3. Results and discussions

In this section, current status of the industrial workforce in Tigray, the binding constraints in the area and the potential solutions for corresponding binding constraint are presented.

3.1 Current Status of the Industrial Workforce in Tigray

The investigation regarding the education level of employees in Tigrayshowed that the large majority (67.2%) of the employees of the manufacturing firms possessed general education level or below as shown in Table 2. The proportion of employees with college and University degree is only 14.3%. Since education has key role in productivity, efficiency, effectiveness, invention, and innovation, there is a lot of room for the manufacturing firms to develop their capacities through in-the-work-place trainings and beyond.

Table 2: Education level of employees in manufacturing firms

Education category	Number	Percent
Illiterate	111	9.1
Primary	310	25.5
General education	397	32.6
Preparatory	151	12.4
College	105	8.6
TVET	74	6.1

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University	70	5.7

In relation to labor market based on knowledge and skill level, firms were asked to identify the type of labor they found difficult to employ or find. The question was contextualized to ask for good enough or industry specific demand for level of education. As in Table 3 about 35.7% and 35% of the firms reported that talented designers and skilled labor are the two most types of labor that the firms found difficult to locate, respectively. Quality labor is often associated with increased productivity and effectiveness (even, efficiency). The fact that the firms struggled to have access to skilled labor in general meant that their potential for productivity and growth was limited. The lack of skilled labor and talented designers affect most firms. About 35.7% of the firms were not able to find the talented designers and 35.0% of the firms were not able to find the skilled labor they needed for the production activities. The fact that such large numbers of firms were not able to have readily accessible skilled labor and talented designers shows the scale of the job (responsibility) that relevant stakeholders wait. It calls for the training and continual supply of quality (skilled and talented) labor and designers if manufacturing firms are going to grow and make meaningful contribution to employment and income growth of employees.

Table 3: Labor type and shortage in manufacturing firms

Type of labor	Number	Percent
Lack of skilled labor	295	35.0
Lack of unskilled labor	52	6.2
Lack of talented designer	301	35.7
Lack of Managerial skilled	192	22.8
Others	2	0.2

Moreover, firms were also asked to identify and rank the factors that may have deterred them from having readily accessible market for skilled labor and talented designers. The data in Table 4 show lack of labor incentives (13%) was identified as the most important factor that prevents firms from attracting skilled labor. In a competitive manufacturing industry, competitive labor incentives represent the key instruments that enable firms to attract the best employees (skilled labor and talented designers). Labor incentives alone, however, may not be sufficient if they are

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not backed up by attractive wages and convenient work place environment. The manufacturing firms identified Low wage (12.1%) and inconvenient work place (10.8%) as the next most important enabling conditions for attracting skilled labor. Training and development (11.6%) and livability of the work environment manifested by accommodation (9.6%) and transport (9.7%) costs were also singled out as factors that determine skilled labor attraction by manufacturing firms.

Table 4: Main constraints for attracting unskilled and skilled labor, talented designers and skilled managers

Constraints	Unskilled labor		Skilled labor		Skilled managers		Talented designers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Low wage	279	15.7	225	12.1	159	11.0	170	10.6
Inconvenient working place	203	11.4	201	10.8	150	10.4	161	10.0
Shortage of skilled labour	179	10.1	235	12.7	180	12.5	206	12.8
Lack of labor incentives	210	11.8	242	13.0	187	13.0	206	12.8
High price of accommodation	118	6.7	179	9.6	156	10.8	170	10.6
Implement job/ nature of the job	158	8.9	175	9.4	135	9.4	156	9.7
Lack of transport access	175	9.9	180	9.7	140	9.7	163	10.1
Lack of attractive social services	199	11.2	184	9.9	151	10.5	166	10.3
Lack of training and development	252	14.2	216	11.6	162	11.2	183	11.4
Others	–	–	19	1.0	22	1.5	25	1.6

The investigation in the region also identified the factors that deter the sector from obtaining skilled labor, talented designers and skilled managers. The responses were quit similar. Lack of incentives, wages, costs of accommodation and transport and inconvenient work place environment were identified as the most important factors that also prevent from obtaining skilled labor, talented designer sand skilled managers. Poor living conditions of the general work place environment manifested by the lack of social services are other important factors which

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prevent the attraction of skilled labor and talented designers and managers by the manufacturing firms.

Addressing the core elements of an industrial workforce such as enabling workplace culture, employee welfare, diversity and inclusion, talent acquisition and retention, and skills development generally lead to a competitive workforce characterized by high productivity, low employee turnover, and matched skills. A manufacturing sector that faces low productive and unmotivated workforce cannot effectively compete and thrive in a highly globalized world.

On the one hand, an active assessment of skills needs of the economy, projection, and aligning training systems to the need will lead to better matching of skills, enhanced productivity, and a stable labor force. A rigid and supply-driven education and training policy, on the other hand, is destined to fail.

Since labor productivity is lower in agriculture and the informal sector, faster and robust structural change towards the manufacturing sector is needed for a sustainable and progressive growth of productivity anticipated to significantly minimize poverty. To achieve structural transformation from agrarian to industry and service-based economy, capitalizing on the abundance of labor resource in Tigray by ensuring an ethical and productive workforce is necessary.

Mega industrial parks such as Mekelle industrial park, Raya valley agro-processing, Humera agro-processing are being built in earnest in Tigray. This will lead to massive demand of trained and trainable workforce. Hence, to attract, retain, expand the manufacturing sector and remain competitive, a motivated and productive industrial workforce is indispensable.

Not to mention the difficulty of finding labor (skilled and unskilled), retaining labor is altogether another challenge. The manufacturing industry is characterized by high labor turnover. Often, manufacturing firms find it difficult to retain the labor force they have at their disposal. First, the firms were asked about turnover situation for different labor types. Many of the manufacturing firms experience a great deal of labor turnover. As indicated in Table 5, skilled managers (29.5%) and talented designers (27%) turnover is the most severe. Still, about 18.6% of the firms

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rated the turnover of skilled labor an "important one" ("important degree"). The firms that reported that they did not experience labor turnover range from 17.6% for talented designers to 24.9% for skilled labor. In other words, one way or another, manufacturing firms in Tigray experience significant skilled manpower (skilled labor, skilled managers and talented designers) turnover.

Table 5: Laborturnover in manufacturing firms (%)

Level of turnover	Unskilled labor	Skilled labor	Skilled managers	Talented designers
Not at all	30.3	24.9	21.8	17.6
Somewhat important	52.1	53.2	32.3	39.0
Important degree	12.0	18.6	29.5	27.0
Do not know	5.6	3.2	16.5	16.4

In response to such skilled labor, managers and designers turnover, strategies were needed to ensure effective retention of labor force. Firms, in this regard, were asked to identify the strategies that have used to retain labor. The response presented in Table 6 depicts two most important labor retention schemes practiced by firms were socialization (16.9%) and training and development (15.5%). Other important schemes included implementation of employee welfare in workplace (12.1%) and effective leadership (10.6%). There were other schemes used by firms to retain labor, which included recruitment related realistic job previews, allowance, promotions, and privileges. It is understood that firms can use various labor retention schemes to retain the best of their assets such as the most skilled, the talented designers and managers.

Table 6: Labor retention schemes

Type of labor retention scheme	Number	Percent
Recruitment/ selection (realistic job previews)	123	7.9
Socialization	262	16.9
Training and development	240	15.5
Compensation and reward incentives	132	8.5

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Effective leadership	164	10.6
Employee engagement	133	8.6
Employee welfare in workplace	188	12.1
Privileges (discounts of entities)	65	4.2
Promotion and regular increments	95	6.1
Allowances (food, housing, transport)	146	9.4

In relation to labor, firms were also asked the types of skills their employees lacked. Problem solving and critical thinking related analytical thinking (16.4%) were the most important skill lacking among employees of the manufacturing firms, Table 7. This skill may be critical for managers who will have to amass leadership skills for effective running of manufacturing businesses. Computer skills, organization skills and industry-specific operational skills are among the other important skills that the firms reported their employees are lacking. Industry-specific operational skills particularly is key for manufacturing firms where the labor force within the industry would need to be equipped with such key skill for profitability and growth of manufacturing firms.

Table 7: Skill types that employees lacked

Type of labor skill	Number	Percent
Analytical skills (critical thinking, problem solving)	300	16.4
Physical skills (lifting, moving)	96	5.3
Basic Computer skills (programming, technical support)	287	15.7
Language skills (bilingualism)	107	5.9
Organizational skills (time management, punctuality)	198	10.8
Motivation (attention to detail, initiative, honesty)	162	8.9
Interpersonal skills (communication, teamwork)	151	8.3
Basic skills (literacy, numeracy)	107	5.9
Industry-specific operational skills	192	10.5
Business communication skills (writing, presenting, etc.)	129	7.1
Vocational skills	99	5.4

It is obvious that employees in manufacturing firms need successive trainings at centers from within or outside for improved productivity, quality and safety. Hence, firms were asked for their possible training providers and centers where they send their employees to train or consider as their source to recruit from. To this end, Table 8, in-house training centers (20.4%) and TVETs (19.2%) account the major share. Though Government agencies (8.3%) play important role, employees' self-directed trainings (11.3%) are also significant so far in Tigray. Observing at the share of Colleges/Universities (5.9%), it can be good indication of lower status of University-Industry Linkage.

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Table 8: Training providers for employees in manufacturing firms

Possible training providers	Responses	
	Number	Percent
Training is not given/required at this time	114	10.4%
College/university	64	5.9%
TVET training centers	210	19.2%
Consultants	39	3.6%
Business Development Centers	59	5.4%
Seminars/Workshops	76	6.9%
Professional association	27	2.5%
Government agencies	91	8.3%
Labor unions	25	2.3%
In-house in the company	223	20.4%
Employees' self-directed training	124	11.3%
Online training service	18	1.6%
Company's suppliers	24	2.2%

Provisions of insurance and benefit schemes to employees are in line with various labor retention mechanisms that a firm is best to have. Firms were, therefore, asked for what types of insurance schemes are exercising. As to their response, Table 9, medical insurance (36.7%) is the major insurance scheme followed by accident and dismemberment coverage (18.4%). Though rest of the insurance schemes are also known for their high impact in labor productivity, the response shows lower attention is given for overall insurance scheme which the firms have to work on.

Table 9: Items of insurance in firms offered to employees

Insurance types provided	Responses	
	Number	Percent
Medical Insurance	130	36.7%
Accidental Death & Dismemberment Coverage	65	18.4%
Dental Coverage	16	4.5%
Life Insurance	32	9.0%
Long-Term Disability	29	8.2%
Prescription Drug Coverage	32	9.0%
Short-Term Disability	33	9.3%
Vision Coverage	17	4.8%

Leave is also one of the main factors which may influence the overall performance of manufacturing firms. In fact some leaves are mandatory rights of employees to be made in paid mode and some may be negotiable to the advantage of both the employee and the firm. Putting certain paid leave schemes, firms were asked for what types of paid leaves are offering to their employees. Among which, holyday leave (26.9%) and sick leave (22.7%) are the highly exercised ones as shown in Table 10. Bereavement/funeral leave (11.7%) and maternity/paternity

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leave (11.3%) are also significantly being exercised. The entire essence of exercising justified paid leave is, actually, to contribute in inducing sense of ownership on employees.

Table 10: Types of paid leave offered to employees

Types of paid leave	Responses	
	Number	Percent
Bereavement/Funeral Leave	104	11.7%
Holiday Leave	239	26.9%
Maternity/Paternity Leave	101	11.3%
Paid-Time-Off (PTO)	51	5.7%
Personal Days/Floating Holidays	67	7.5%
Sick Leave	202	22.7%
Training Leave	87	9.8%
Vacation leave	39	4.4%

Manufacturing firms in Tigray are also asked for what additional benefits they offer to their employees. Among many, bonuses (32.8%) and clothing (27.1%) are the highly exercised schemes as depicted in Table 11. However, it may be learned that the overall labor retention efforts through offering benefits are weaker in firms based in Tigray.

Table 11: Additional benefits offered to employees

Some additional benefits	Responses	
	Number	Percent
Bonuses (annual, hiring, holiday, productivity, etc.)	173	32.8%
Childcare Assistance (reimbursements, on-site centers, etc.)	11	2.1%
Clothing/Uniform Allowance/Reimbursement	143	27.1%
Company Vehicle/Mileage Reimbursement	24	4.5%
Employee Assistance Program	30	5.7%
Flex Spending Account/Cafeteria Plan	26	4.9%
Profit Sharing/Stock Options	32	6.1%
Relocation/Moving Expense	17	3.2%
Retirement Package	16	3.0%
Shift Differential Pay (2nd/3rd shift, or Weekend)	15	2.8%
Tuition Assistance/Educational Reimbursements	15	2.8%
Wellness Program	26	4.9%

Not to mention, organizational structure of firms is an important deal towards efficient functionality, productivity and product quality within which administering the workforce takes great attention. Among the ways on how firms organize the workforce, presented in Table 12, organizing workers so that they make complete products (47.2%) is the highly exercised approach followed by multi-skilled production teams (34.5%) and bundles of specialized

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workers (17.8%). It may be recommended that firms should have respective optimized organizational structure depending on the nature and scale of firms.

Table 12: Ways of organizing workforce in firms

Ways of organizing workforce	Responses	
	Number	Percent
Workers are organized in bundles and workers specialize in specific task	104	17.8%
Workers are organized in production teams and are multi-skilled	202	34.5%
Workers make complete products	276	47.2%
Others	3	0.5%

Provisions of appropriate trainings for firm managers, no doubt, is very crucial for productivity, product quality and market connections. Whether the training may be given within the firm or outside, it should always be based on its relevance. Hence, firm managers may get trainings in-house, in other places of the nation out of the firm and abroad, whenever deemed necessary. Firms in Tigray were asked for their destinations to train managers. Based on their responses towards the points given in Table 13, it was observed that in-house trainings (65.8%) are the most exercised followed by the trainings within the country (23.6%). Trainings from abroad (8.5%) are shown to be relatively low.

Table 13: Training destinations of firm managers

Possible training destinations for managers	Responses	
	Number	Percent
Managers are trained in house	254	65.8%
Managers are trained in special courses in country	91	23.6%
Managers are trained in special courses in abroad	33	8.5%
Other	8	2.1%

3.2 The Binding Constraints

Following the perception-conformity study in Tigray, based on primary and secondary data, seven key constraints of the manufacturing sector in relation to workforce are identified. These are:

i. Attitudinal problems (work culture and work discipline)

The problem in relation to labor ethics and culture is reflected through multiple social engagements resulting in high absenteeism and poor punctuality. Moreover, lack of work

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discipline and patience, limited media coverage on entrepreneurship and work ethics, inflexible labor market that doesn't screen performance adequately,less/no reward for hard-work and absence of incentive system at workplace are the main causes for this binding constraint.

ii. Inadequacy of skills development

Skill supply and demand mismatch which results in either skills shortage or surplus, skill gap that workers lack required skill level, inadequate training from firms side, high recruitment costs and difficulty of finding workers with the right skills, lack of research and development units in industries, private & public sectors, poor quality training systems, low level of soft skills, lack of practical training in TVETs and general education not producing trainable workforce are attributes of inadequate skill development.

iii. Weak University/TVET-Industry linkage

The trend shows that industries are not involved in curriculum development of University/TVET institutions hence trainings are generally supply-driven. Firms themselves are also not willing to provide internship and apprenticeship opportunities to trainees.

iv. Limited skilled workforce database and poor labor market information system

Skill needs of industries, sectors, and sub-sectors not monitored and recorded. Existing job centers at the bureau of labor and social affairs are weak and focus on specific types of employees such as house-maids and foreign-employment: no dedicated job centers that focus on industrial workforce. Moreover, recruitment costs are high for firms and hence resort to informal recruitment mechanisms such as networks and job-referrals which are biased against women and the youth. High job-search costs or jobseekers - searching for vacancies posted on physical job boards at specific points in the city—entails high transportation costs. For many in rural areas, manufacturing jobs outside their Woredas can be extremely expensive or completely inaccessible.

v. Poor human resource management and industrial relations

This binding constraint is characterized by poor talent management (attraction & retention schemes), the informal recruitment systems, limited promotion opportunities (limited career progression), limited provision of on-the-job and off-the-job training opportunities, weak local-expatriate workers relations resulting in employer-employee conflicts, weak labor union and inefficient conflict resolution mechanism.

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vi. Less attention on welfare of workers

The low wage, low income tax threshold (currently starts at Birr 600), high cost of living due to rising housing, transport, and meal costs resulting in high labor turnover and putting pressure on wages to rise without improvement on productivity. Limited labor flow to the manufacturing sector due to higher income in the informal sector such as self-employment also contributes to the constraint.

vii. Lack of an organization that coordinates skill development

The absence of an agency in the form of an industrial job center that keeps a record of job seekers, which provides training to them, and links them with firms floating vacant jobs, has contributed to skill-mismatch. Due to lack of job centers that link job seekers with firms, the cost of recruitment is often costly. Moreover, the search cost for an employee is also high leading to a poor matching and discouraged workforce. Skills mismatch, in turn, leads to lower labor productivity and high labor turnover both of which impact the competitiveness of the manufacturing sector.

3.3 Potential Solutions for Respective Binding Constraints

Though independent solutions are recommended for every binding constraint, there are also solutions in common.

i. To addressattitudinal problems (work culture and work discipline) the following solutions are recommended:

- Media coverage on work ethic
- Train University students on work-ethic and dispatch them to schools in their Woredas to teach
- Strengthening the existing civic and ethical education at all levels
- Training of work ethic at job-centers and regional training centers
- Subsidize firms with a great working environment and proper health and safety systems
- Reform the labor market in such away it rewards performance
- Encouraging creativity in schools

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ii. *To address the inadequately trained and poorly trainable workforce the following solutions are recommended:*

- Establish Tigray Skills Development Council
- Introduce an incentive system for firms that provide in-house training (e.g. subsidies)
- Incentivize firms that provide internship and apprenticeship for trainees
- Make TVET training practical oriented
- Arrange for TVET instructors and management to spend time at enterprises
- Arrange for enterprises managers and operators to give guest lectures in TVET centers
- Establish industrial job centers under the council

iii. *To address the weak University/TVET- Industry linkage the following solutions are recommended:*

- Arrange regular job-fairs at Universities and TVET
- Set up regular higher education/TVET- Industry forum
- Involve industries in skill need assessment coordinated by the council
- Incentivize firms that provide internship and apprenticeship for trainees (e.g. subsidies)
- Arrange for TVET instructors and management to spend time at enterprises
- Arrange for enterprises managers and operators to give guest lectures in TVET centers

iv. *To address the limited skilled workforce database and poor labor market information system the following solutions are recommended:*

- Creating industrial job centers
- Continuous data acquisition on labor market outcomes & indicators
- Regular job fairs in Universities and TVET centers for employers to recruit new graduates
- Council should facilitate regular skill needs of enterprises
- Council should keep record of existing stock of industrial workforce regularly

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- Council should coordinate pre-employment trainings, skill-upgrading and employability
- Encourage the use of ICT to provide information on job vacancies
- Council should take measures to attract workforce from other regions in areas with shortage
- Introduce urban safety nets and labor market programs to enhance skills

v. *To address the poor human resource management and industrial relations the following solutions are recommended:*

- Encourage (subsidize) for firms with great working environment (Health and Safety)
- Assess the current tripartite conflict resolution system (employee, employer, and industry)
- Assist the establishment of unions
- Arrange regular platforms for employers and unions
- Training of local law enforcement bodies such as the regular and community police on industrial conflict resolutions
- Establish a special court system dedicated to only work-employer conflict resolution
- Introduce Kaizen for better team work
- Establish a regional industrial talent management institute

vi. *To address the less attention on welfare of workers the following solutions are recommended:*

- Provide land free of charge to firms for building workers' accommodations
- Provide infrastructure such as roads, power, water, schools, and medical centers that, especially, cater to workers
- Increase the income tax threshold (currently at 600) and tax exemptions on allowance
- Encourage firms to provide basic items such as sugar and oil at subsidized cost
- Encourage firms to provide meals and subsidized basic items to workers

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- Regularly assess whether enterprises have the required health and safety standards in place
- Provide training to firms on health and safety standard and monitor their implementation

vii. *To address the lack of an organization that leads workforce developmentthe following solutionsare recommended:*

- Establishing a centre dedicated to regularly assessment of skill needs of the industry and adjusts training programs accordingly, and enhances employability of workers organizing coaching and job search support. This can be done through the establishment of the Tigray Skills Development Council (TSDC). The TSDC can report to the Bureau of Urban Development, Trade and Industry Bureau (UDTIB) of Tigray region.
- Strengthen industrial job centers at Woreda level that directly report to the Tigray Industrial Workforce Development Center

4. Conclusion

Addressing the core elements of an industrial workforce such as enabling workplace culture, employee welfare, diversity and inclusion, talent acquisition and retention, and skills development lead to a competitive workforce are characterized by high productivity, low employee turnover, and matched skills. A manufacturing sector that faces low productive and unmotivated workforce cannot effectively compete and thrive in a highly globalized world.

On the one hand, an active assessment of skills needs of the economy and projection and aligning training systems to the need will lead to better matching of skills, enhanced productivity, and a stable labor force. A rigid and supply-driven education and training policy, on the other hand, is destined to fail.

As labor productivity is weaker in agriculture and related areas, basic structural change towards the manufacturing area is needed for a sustainable enhancement of productivity thereby significantly minimize poverty. To achieve structural transformation from agrarian to industry and service-based economy, capitalizing on the abundance of labor resource in Tigray by

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ensuring an ethical and productive workforce is found necessary. For this reason, the main constraints in relation to industrial workforce are investigated and their prospective solutions are recommended.

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References

[1] D. Q. Chi, "Employee participation in Viet Nam," 2012.
[2] "Skilling up Vietnam: Preparing the workforce for a modern market economy," 2014.
[3] K. Green, M. López, A. Wysocki, K. Kepner, D. Farnsworth, and J. L. Clark, "Diversity in the Workplace : Benefits , Challenges , and the Required Managerial Tools," *IFAS Extension, Univ. Florida*, pp. 1–3, 2015.
[4] D.-I. Kim and R. H. Topel, "Labor Markets and Economic Growth : Lessons from Korea ' s Industrialization , 1970-1990," in *Differences and Changes in Wage Structures*, 1995, pp. 227–264.
[5] J. Lee, "The labor market in South Korea , 2000 – 2016," *IZA, World Labor*, pp. 1–11, 2017.
[6] "Labour Market Report First Quarter 2017, Ministry of Manpower-Singapore," 2017.
[7] C. Y. Jie, C. Tai, and W. Liang, "The Road to Singapore ' s Future Economy," *MAS-ESS Essay Compet.*, pp. 1–24, 2016.
[8] Y. Di, "China's Employment Policies and Strategies," *Minist. Labour Soc. Secur. China*, pp. 1–12, 2005.
[9] Z. Xiangquan and Y. Yumei, "Challenges and Resolutions in China's Labor Market," 2015.
[10] "World Bank Annual Report," 2015.
[11] "The world Bank Enterprise Surveys, What Business Experience, Ethiopia-2015, Country Profile," 2015.
[12] H. T. Dinh, V. Palmade, V. Chandra, and F. Cossar, "Light Manufacturing in Africa," *Agence Française Développement World Bank*, pp. 1–184, 2012.
[13] C. Blattman and S. Dercon, "The Impacts of Industrial and Entrepreneurial Work on Income and Health: Experimental Evidence from Ethiopia," *Harvard Dataverse*, 2017.
[14] R. D. Joshi and A. Verspoor, "Secondary Education in Ethiopia: Supporting Gowth and Transformation," *World Bank*, pp. 1–264, 2013.

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