ANALYSIS OF FACTORS AFFECTING THE ROLE OF VOCATIONAL TRAINING ON THE INTERNATIONAL LABOR MARKET

Aynura Manaf Ismayilova
Azerbaijan Technical University, Baku, Azerbaijan
aynura.ismayilova@aztu.edu.az, https://orcid.org/0000-0003-4372-6066

Abstract. In a rapidly globalizing world economy, vocational education and skills development play a decisive role in shaping sustainable and competitive labor markets. As globalization accelerates cross-border investment, industrial transformation, and technological change, the international labor market increasingly demands a highly skilled and adaptable workforce, prompting vocational education systems to undergo strategic reform. Continuous upskilling and reskilling, supported by lifelong learning, have become essential: the WEF estimates that around 39% of workers' core skills will change by 2030, intensifying the need for adaptable, skills-first education and training systems.

This study analyzes new approaches to vocational education against the backdrop of rapid technological development and the globalization of the labor market. It argues that Azerbaijan's vocational education system remains insufficiently aligned with these realities, in particularly technological innovation and the rising requirements of the international labor market. Drawing on the standards and indicators of international organizations such as World Skills, ILO, and UNESCO-UNEVOC, the study diagnoses the system's principal structural and content-related problems, examines the role of university-based Lifelong Learning Centers, and develops evidence-based recommendations for improvement.

Keywords: *lifelong learning, reskilling and upskilling, labor market globalization, technological change, digital skills, employability, Azerbaijan.*

INTRODUCTION

Problem background

Vocational skills are fundamental to productivity, innovation, and employment, and a substantial body of recent evidence documents the economic and social returns to investing in them:

- according to the OECD, when workers' skills remain under-used, productivity suffers, innovation slows, and wage progression weakens, making effective use of skills as important as producing them [1];
- the World Bank finds that about two-thirds of the income gap between developed and developing countries can be attributed to differences in human capital, and a 15-point gain in the Human Capital Index is associated with roughly 15% higher future GDP per worker [3];
- in the EU, the employment rate of recent medium-level vocational education graduates (aged 20–34) was 80.0% in 2024, against an EU target of at least 82% by 2025 [4];
- in the field of AI, 46% of leaders cite skill gaps as a major barrier to technology adoption [5];
- around 39% of workers' core skills are expected to change or become outdated by 2030, down from 44% in 2023, reflecting continued but slowing skill instability [2, Figure 3.1];
- if the global workforce were 100 people, 59 would require reskilling or upskilling by 2030, and 11 of them would be unlikely to receive it, leaving them at risk of redundancy [2, Executive Summary];
- skill gaps are seen as the single biggest barrier to business transformation, cited by 63% of employers, while 85% of employers plan to prioritize workforce upskilling [2, Executive Summary];
- job disruption is projected to equal 22% of jobs by 2030, 170 million new roles created and 92 million displaced, a net gain of 78 million [2, Executive Summary];
- UNESCO frames lifelong and adult learning as a catalyst for empowerment and adaptability in the face of digitalization and economic change [6]; reinforcing this, 50% of the workforce has already completed training as part of learning-and-development initiatives, up from 41% in 2023 [2, Section 3];

- LinkedIn reports that 91% of learning-and-development professionals agree continuous learning is more important than ever for career success, while 49% say their executives are concerned that employees lack the skills to execute business strategy [8].

The globalization of vocational education is driven directly by international investment and labor mobility. The ILO's World Employment and Social Outlook: Trends 2025 reports global unemployment of 5% in 2024 but persistently high youth unemployment of 12.6%, and calls for improved vocational training to prepare the workforce for green and AI-driven sectors [7]. As economies become more interconnected, countries increasingly develop vocational education systems that reflect global standards, technological trends, and international labor market dynamics.

Against this background, recent years have seen a marked rise in vocational-education applications from Azerbaijan, especially to Germany through the Ausbildung track and growing efforts to access employment opportunities through this route. This raises two central questions. First, what factors shape the integration of Azerbaijan's vocational education system into modern technological development and the international labor market, and its adaptation to their requirements? Second, how can the employment prospects be improved for "uncompetitive" individuals who possess real skills but graduated from the "old" system and are unaware of the new system's requirements?

For these individuals, two problems emerge prominently: (1) weakening competitiveness in the local labor market, driven by new technologies and rapid technological innovation; and (2) an inability to integrate into or even envision the international labor market, due to a lack of globally aligned skills and certificates and insufficient language and digital competencies.

The purpose of this study is to analyze these problems systematically, diagnose the vocational education system against international indicators, and develop practical recommendations for improvement, including determining the role that university-based Lifelong Learning Centers can play in these processes.

Current situation

The number of vocational schools in Azerbaijan changes from year to year as institutions are merged, restructured, or privatized through reforms. As of early 2024, 92 vocational education institutions were operating, providing technical and vocational education across various fields in both Baku and the regions [9]. In line with the ongoing infrastructure reform, several trends have emerged in recent years: (i) rising enrollment, accompanying growing demand for diverse specialties; (ii) initiatives to restructure and modernize institutions, especially those located in the regions; and (iii) cooperation with countries such as Korea and Germany through international projects and technical-support programs.

Having a look to the brief **statistical review** based on data from the State Statistical Committee of the Republic of Azerbaijan and the Ministry of Science and Education [9] (Table 1-2).

1. *Number of institutions.* At the beginning of 2024, 92 vocational education institutions were operating nationwide, 7 fewer than the previous year (a decrease of about 7.1%).
2. *Enrollment and graduates.* By early 2024, the number of students in vocational schools reached 29,144, an increase of 3,218 (12.4%) over the previous year. Admissions totaled 22,194 (up 1,148, or 5.5%, year on year), and graduates reached 14,645 (up 792, or 5.7%). Relative to 1990, when 82,188 students were enrolled, the 2024 figure represents a decline of roughly 35%.
3. *Low interest in primary vocational education.* In recent years only about 11% of general-education graduates have chosen primary vocational institutions, and total enrollment at that level is only 25,000–27,000, evidence of limited public interest.
4. *Youth not in employment, education, or training (NEET).* According to the State Statistical Committee, the share of young people aged 15–24 not in employment, education, or training was 19.5% in 2023 and 19.8% in 2022 [10]. This indicator follows the ILO sample-survey methodology applied within SDG 8.

5. *Labor market and vocational education.* Labor demand and supply are shaped by the demographic situation, the gender–age structure of the population, working capacity, employment dynamics, labor migration, and education level. The country's population grew from 7,131,900 in 1990 to 10,180,800 in 2024, yet the number of people pursuing vocational education declined.
6. *Types of institutions.* The system comprises three main institution types: (1) vocational schools; (2) vocational lyceums (now largely merged or liquidated); and (3) vocational education centers (created recently by merging several schools and lyceums through reform).
7. *Distribution.* As of early 2024, of the 92 institutions, 24 were located in Baku and the remainder in the regions. In 2018, 10 specialized centers were established on the basis of 20 former institutions.

Table 1

Vocational education institutions and student numbers, Republic of Azerbaijan, 1990–2023 [9]

Year	Number of institutions (end of year)	Students, persons	of them: girls, persons
1990	176	82,188	33,944
1991	167	75,257	26,340
1992	169	64,734	22,333
1993	167	53,819	16,899
1994	162	42,277	13,275
1995	160	27,689	6,922
1996	119	25,030	8,185
1997	118	24,013	7,852
1998	118	23,527	8,211
1999	108	22,696	8,034
2000	110	22,944	8,420
2001	109	21,619	6,853
2002	109	20,753	6,973
2003	110	21,677	6,622
2004	110	21,563	6,560
2005	107	22,189	6,513
2006	107	23,813	6,825
2007	107	24,455	7,242
2008	108	25,184	7,645
2009	108	25,562	7,514
2010	109	27,330	7,901
2011	108	28,993	8,399
2012	108	30,664	8,746
2013	112	29,234	8,163
2014	113	25,414	6,912
2015	113	24,482	6,453
2016	112	23,814	5,986
2017	111	24,024	5,833
2018	111	23,965	5,552
2019	110	23,193	5,523
2020	103	22,012	5,583
2021	99	22,749	5,942
2022	99	25,926	7,579
2023	92	29,144	8,563

Table 2

Distribution by economic region and administrative-territorial unit, early 2024 [9]

Region / administrative-territorial unit	Institutions	Admitted	Students	Graduates
Republic of Azerbaijan	92	22,194	29,144	14,657
Baku city	24	7,779	11,335	5,254
Nakhchivan Autonomous Republic	3	1,695	–	1,738
Absheron-Khizi	5	986	1,427	572
Mountainous Shirvan	2	462	638	242
Ganja-Dashkasan	8	2,224	2,957	1,458
Karabakh	7	1,237	1,758	642
Gazakh-Tovuz	5	917	1,451	510
Guba-Khachmaz	7	927	1,464	648
Lankaran-Astara	5	1,082	1,507	581
Central Aran	6	1,196	1,568	765
Mil-Mugan	4	660	975	389
Sheki-Zagatala	7	1,754	2,268	1,156
Eastern-Zangezur	4	172	151	92
Shirvan-Salyan	5	1,103	1,645	610

Regulatory and legal framework, strategic documents and projects

State policy in vocational education is implemented by the Vocational Education Agency under the Ministry of Science and Education, established by Presidential Decree in 2016 to coordinate state policy, organize subordinate institutions and prepare competitive, qualified personnel [11]. Under current legislation, institutions take three legal forms. Vocational schools deliver basic primary and technical vocational skills on a traditional, practice-based model, but often with outdated infrastructure and weak labor market adaptation. Vocational high schools combine a secondary qualification with vocational skills and act as a transitional, medium-level form (many reorganized through mergers). Vocational education centers, a product of reforms merging several schools and high schools offer modern infrastructure, a demand-driven spectrum of specialties and a modular, competency-based approach with ICT equipment, industrial partnerships and practical training. Admission is after grades IX and XI: a three-year track (after grade IX) yields both a general-secondary and a vocational certificate, while a one–two-year track (after grade XI) yields a Certificate or Diploma [11].

Specialties span traditional trades (cook, welder, electrician, network administration) to high-technology fields (drone repair, electric/hybrid-vehicle repair, solar-panel installation, medical-equipment service). In 2024/2025, up to 400 students enrolled in 9 new dual-education specialties created in line with modern technologies and labor market demand [11]. Vocational education is supported by several strategic documents: the Strategic Roadmap for VET (2016), the State Strategy for the Development of Education (2013), the Employment Strategy 2019–2030 (Presidential Decree, 2018), and Azerbaijan 2030: National Priorities (2021), which makes “Inclusive and Quality Human Capital” including VET and lifelong-learning centers, a national priority. The National Qualifications Framework for Lifelong Learning (2018) further underpins a culture of lifelong learning and demand-driven skills [12-13].

Vocational education centers: the Korean experience

Among the centers analyzed, the newly established Baku State Vocational Education Center for Industry and Innovation stands out: aligned with Korean standards and expected to operate from 2025 with KOICA support under an intergovernmental agreement [14, 16]. It offers capacity for 1,000 students, 25 specialty laboratories, 7,000 m² of workshops and two dormitories, specializing in mechanics, electronics, electrical engineering, industrial installation, construction and IT. Students study

for one or three years (plus 3–6-month courses); programs are developed by Korean specialists and are 60–70% practical [15].

Capacity building in new vocational centers: international projects

International projects have strengthened the system, especially in newly established centers:

- "Vocational Education and Training for the Future" (UNDP & EU, 2020–2025), competency-based education, digital skills and private-sector links across seven institutions [16].
- "Strengthening the Vocational Education System of Azerbaijan" (KOICA, 2016–2019), infrastructure, curricula and teacher development, applying Korean experience [17].
- "Support to the Establishment of Advanced VET Centers" (EU, 2020–2024), modernization, digitalization and inclusive education in five regions [18].
- "Strengthening VET in Azerbaijan" (UNESCO, 2018–2021), quality and alignment with international standards [19].
- "Development of VET in Azerbaijan" (GIZ, 2017–2020), modernization and labor market adaptation [20].
- Tourism Education Training Program / Experience Exchange (TIKA, 2022), upskilling tourism professionals and exchange with Turkish institutions [21].

Vocational education and the labor market

Graduate placement and quality were assessed across three factors. Labor market relevance: qualifications target technology, automation, ICT, construction, transport and manufacturing, with strengthening student–graduate–employer integration and significant investment in industrial transformation; interregional links need improvement. International standards: dual and practical models from Korea and Germany are applied in line with OECD, UNESCO and ILO recommendations on learning outcomes, assessment, gender equality and inclusion; wider use of the National Qualifications Framework is still needed. Curriculum and skills: modernized content is 60–70% practical, with micro-qualifications and 3–6-month certification courses supporting flexible entry; teacher-training and mentoring remain areas for improvement.

Global integration of vocational education: SWOT analysis

The integration of Azerbaijan's vocational education into the global system is summarized in the SWOT analysis below (Table 3).

Table 3

SWOT analysis of the global integration of vocational education in Azerbaijan

Strengths (S)	**Weaknesses (W)**
✓ Reforms in state policy (e.g. strategic roadmaps for 2020–2025) ✓ Sometimes increasing interest in vocational education ✓ Successful implementation of certain pilot projects (EU, UNESCO, KOICA, GIZ) ✓ Establishment of some modern vocational centers	✓ Lack of widespread implementation of the dual education system ✓ Staff shortage–lack of qualified trainers and teachers ✓ Uneven distribution of infrastructure (lack of it in the regions) ✓ Poor integration with the labor market and limited cooperation with employers
Opportunities (O)	**Threats (T)**
✓ Opportunity to learn from successful models of Germany, Korea, Canada ✓ International programs and financial support (Erasmus+, KOICA, EU TVET projects) ✓ Application of digital technologies (online courses, LMS systems) ✓ Increasing demand for new skills in the era of Industry 4.0	✓ Overall low interest in vocational education and stereotypes about it (disinterested approach of families) ✓ Difficulty in adapting to technological changes ✓ Economic instability and financing problems ✓ Lack of international recognition of certificates

The international importance of vocational education: Indicators and standards

To assess the relevance of vocational education to the international labor market, a conceptual framework drawing on the main international indicators was applied. The WorldSkills competency framework sets internationally agreed standards and assessment criteria across occupational fields [22]; the UNESCO-UNEVOC TVET quality criteria cover labor market relevance, teaching-staff quality, graduate employment and inclusion [23]; the ILO indicators track skills mismatch, re-skilling/upskilling needs and workforce mobility [24]; and the OECD Skills Strategy and CEDEFOP Skills Forecast provide indicators and projections of future skills needs [25-26]. Complementary frameworks include the EQF, ISO 29990, UN SDG 4 and the National Skills Qualifications Framework (NSQF). These indicators, with their methods and tools, are systematized in Table 4.

Table 4

International integration indicators: organizations, purpose, methods and tools

Indicator name	**Organization / Source**	**Purpose of use**	**Measurement method**	**Measurement tool**
Competency Standards (World Skills)	World Skills International	Assessing the practical skills of graduates	Assessment and expert panel for professional competitions	Practical tasks used in competitions, expert assessment forms, scoring tables
Relevance of Curriculum to the Labor Market (UNESCO-UNEVOC)	UNESCO-UNEVOC	Analyzing the relevance of vocational education to market demands	Curriculum analyses and employer surveys	Curriculum analyses, focus groups with employers, labor market relevance surveys
Graduate Employment Rate (UNESCO-UNEVOC)	UNESCO-UNEVOC	Measuring the relationship between education and employment	Statistical employment indicators, surveys	Graduate employment rates within 6–12 months, official statistics and graduate surveys
Skills Mismatch Index (ILO)	ILO	Detecting the gap between skills supply and demand	Empirical models, survey results	Skills-mismatch indices, labor market surveys, employer and graduate survey results
Reskilling and Upskilling Needs (ILO)	ILO	Assessing the flexibility of education and retraining opportunities	Labor market research and trend analysis	Analysis of areas requiring reskilling, surveys on digital and technological change, frequency of program updates
Transition Rates to Vocational Education (OECD)	OECD – Education at a Glance	Analyzing student flows into TVET	Education statistics and enrolment figures	Enrolment statistics, share of students entering VET, analyses by gender and age group
Student–Teacher Ratio (OECD)	OECD – Education at a Glance	Measuring teaching quality and resource shortages	Statistical analysis and school data	Teaching-load statistics, comparison of teacher and student numbers, school management reports
Future Skills Forecasts (CEDEFOP)	CEDEFOP – Skills Forecast	Forecasting future skills needs	Economic and demographic forecasting models	Modelling of skills needs from economic/technological change, sectoral analyses and forecasting tools

Concluding remarks

This analysis offers an initial, not exhaustive view of the research question. The Korean (TVET and work experience) and German (dual education) models are leading examples but are not readily accessible in the local context. Observations by Azerbaijan Technical University (AzTU) and analysis under the KIEP Visiting Scholar Program indicate that effective integration into the international labor market requires a comprehensive approach: a national skills framework based on global indicators, gradual introduction of the L3 model, stronger industry partnerships and closer cooperation between vocational schools and universities.

Proposed master's-level research directions at AzTU include: a methodological framework for measuring and monitoring VET development against international indicators; comparative analysis of skill requirements in local vs. international labor markets under technological and digital integration; assessment of the employment status of graduates of the pre-2016 system; establishment of a national monitoring platform; and empirical research producing strategic proposals and monitoring mechanisms to assess reform effectiveness.

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