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**Educational Competencies and the Quality of Educational Services in  
Higher Education Institutions: Employers' Needs and Labor Market Supply**

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**Abstract:** *Transformational processes in Ukraine's agrarian sector caused by martial law and structural changes in the economy have significantly affected the labor market and the requirements for employees' professional competencies. This*



*highlights the need to align educational training in higher education institutions (HEIs) with employer demands.*

*The aim of the study is to analyze the correspondence between the labor market requirements in the agrarian sector and the competencies developed in HEIs, as well as to identify directions for improving cooperation between employers and educational institutions, contributing to the quality of educational services.*

*Methods. The study employs a systemic analysis of statistical data, comparative analysis of labor market indicators, and synthesis of empirical data from agricultural enterprises. Descriptive and analytical approaches are applied to examine employment trends, workforce demand, and training practices. Particular attention is paid to mechanisms of quality management in education, especially in relation to aligning curricula with labor market needs.*

*Results. It has been established that the agrarian sector is characterized by a reduction in the number of employees due to increasing mechanization and migration processes. At the same time, there remains a high demand for qualified personnel capable of working with modern machinery and digital technologies. Significant gaps have been identified between employer requirements and the outcomes of training in HEIs. Enterprises are increasingly implementing internal training programs and supporting dual education models, which contributes to improving the quality of educational services through practice-oriented learning. The critical importance of digital literacy, technical skills, and foreign language proficiency has been determined.*

*Conclusions. The study confirms the necessity of strengthening cooperation between agricultural enterprises and HEIs. The improvement of the competency-based approach, the development of dual education, and the modernization of educational infrastructure are key conditions for reducing the imbalance between labor market supply and demand. Effective quality management mechanisms in higher education are essential for enhancing the responsiveness of training systems to employer expectations.*



**Keywords:** *vocational education, workforce development, agricultural enterprises, dual education, skills gap, human capital, labor market.*

**Освітні компетентності та якість освітніх послуг закладів вищої освіти:  
потреби роботодавців та пропозиція ринку праці**

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**Анотація:** *Трансформаційні процеси в аграрному секторі України, зумовлені воєнним станом та структурними змінами економіки, суттєво вплинули на ринок праці й вимоги до професійних компетентностей працівників. Це актуалізує потребу узгодження освітньої підготовки у закладах вищої освіти (ЗВО) з запитами роботодавців.*



*Мета дослідження – аналіз відповідності між вимогами ринку праці аграрного сектору та компетентностями, що формуються у ЗВО, а також визначення напрямів удосконалення взаємодії між роботодавцями й освітніми інституціями, що сприятиме підвищенню якості освітніх послуг.*

*Методи. У дослідженні використано системний аналіз статистичних даних, порівняльний аналіз показників ринку праці та узагальнення емпіричних даних діяльності аграрних підприємств. Застосовано описовий та аналітичний підходи до вивчення тенденцій зайнятості, потреб у кадрах і практик підготовки. Окремо розглянуто підходи до управління якістю освітніх послуг у ЗВО в контексті узгодження результатів навчання з потребами ринку праці.*

*Результати. Встановлено, що аграрний сектор характеризується скороченням чисельності працівників унаслідок зростання рівня механізації та міграційних процесів. Водночас зберігається високий попит на кваліфіковані кадри, здатні працювати із сучасною технікою та цифровими технологіями. Виявлено суттєві розриви між вимогами роботодавців і результатами підготовки у ЗВО. Підприємства дедалі частіше впроваджують внутрішні програми навчання та підтримують дуальні форми здобуття освіти, що сприяє підвищенню якості освітніх послуг через практико-орієнтовану підготовку. Підтверджено значення цифрової грамотності, технічних навичок і володіння іноземними мовами.*

*Висновки. Дослідження підтверджує необхідність посилення співпраці між аграрними підприємствами та ЗВО. Удосконалення компетентнісного підходу, розвиток дуальної освіти й модернізація освітньої інфраструктури є визначальними умовами подолання дисбалансу між попитом і пропозицією на ринку праці. Впровадження ефективних механізмів управління якістю освітніх послуг у ЗВО є важливим чинником підвищення відповідності підготовки фахівців вимогам роботодавців.*



**Ключові слова:** професійна освіта, розвиток кадрів, аграрні підприємства, дуальна освіта, розрив навичок, людський капітал, ринок праці.

**Introduction.** Enterprises across all regions have been significantly affected by military aggression, which has intensified existing socio-economic challenges.

The current stage of economic development is characterized by a range of negative trends that influence the formation, development, and reproduction of human resources. These trends manifest in the deterioration of the socio-demographic characteristics of the workforce, leading to intensified labor migration and a decline in its educational, professional, and motivational potential.

Consequently, the issue of human resource management and the efficient utilization of labor potential has acquired particular urgency, driven not only by deep crisis tendencies in the Ukrainian economy but also by structural transformations associated with the transition from a command-administrative to a market-oriented economic system, particularly under conditions of ongoing military aggression against Ukraine.

**Literature Review.** The issue of forming educational competencies, their alignment with employers' needs, and their correspondence to labour market supply is actively examined both in Ukraine and internationally. The study by T. Shterma [1] analyzes the essence of human capital and identifies key challenges in its development under crisis conditions, which directly affect competency formation. The research conducted by T. Shterma and M. Manylich [2] examines personnel management in crisis environments, emphasizing the importance of adaptive skills and professional flexibility. In the work of S. Vasylchak and T. Shterma [3], labour potential is investigated as an object of management, highlighting the role of a competency-based approach in improving human resource efficiency. The findings of V. Yevdokymenko, T. Shterma, and N. Roshko [4] substantiate the importance of analytical support for managing business activity, which presupposes the development of modern professional competencies. Data from the State



Employment Service of Ukraine [5] indicate a mismatch between labour demand and supply, reinforcing the relevance of the skills gap problem.

The systematic review by D. Vlachopoulos and O. Tsitiridou [6] demonstrates that the development of employability skills and university-industry collaboration are key factors in enhancing graduate competitiveness. The study by H. Barachino, A. Timmermans, V. Venhorst, and J. van Dijk [7] examines mechanisms for implementing employability development interventions, identifying their effectiveness depending on institutional support. The analysis conducted by K. Phusavat, P. Ongkunaruk, and P. Anussornnitisarn [8] explores students' perceptions of their competencies, revealing a gap between educational outcomes and labour market expectations. The research by Q. Gao, C. Cheng, and G. Sun [9] emphasizes the role of digitalization and big data in transforming skill requirements in the labour market. The study by J. Jung, Y. Wang, and M. Sanchez Barrioluengo [10] examines the impact of technological unemployment on the changing structure of competencies, stressing the need for continuous skill updating.

The model proposed by M. Grant, C. Hanlon, and J. Young [11] presents a cyclical approach to graduate employability formation, including the stages of preparation, practice, and presentation. The study by S. Chemli, M. Toanoglou, and J. Del Val Roman [12] examines the problem of digital skill shortages and competency mismatches in tourism, highlighting their impact on graduate employment. The research conducted by D. Japaridze, S. Maghlakelidze, E. Shaverdashvili, and D. Tutberidze [13] substantiates the role of higher education in reducing the gap between employer expectations and graduate preparation levels.

The analysis by B. P. P. Yong and Y.-L. Ling [14] highlights the importance of soft skills in employability, revealing differences in how employers and graduates perceive their significance. The study by A. Nelson, A. Ivarsson, and M. Lydell [15] investigates long-term employment outcomes and challenges the conventional understanding of skills mismatch.



Despite the large number of scientific studies, the issue of comprehensive alignment between educational programs and the dynamic needs of the labour market remains insufficiently explored, particularly under conditions of digital transformation and global economic change. At the same time, discrepancies persist in approaches to assessing competencies and determining their relevance for employers. This necessitates further research aimed at developing effective mechanisms for integrating education and the labour market, which defines the relevance of this article.

### **Identification of previously unresolved parts of the general problem.**

Despite a considerable body of research on human resource management and agricultural sector development, several important aspects remain insufficiently explored. In particular, the specific mechanisms for aligning educational competencies with the dynamic needs of agricultural enterprises, especially under conditions of economic instability and military challenges, require further investigation.

Existing studies do not fully address practical instruments for cooperation between agricultural enterprises and vocational education institutions, nor do they sufficiently consider regional disparities in labor market demand and the rapid transformation of skill requirements.

Accordingly, the present study aims to address this gap by focusing on improving coordination between employers and educational institutions to enhance the quality and relevance of workforce training in the agricultural sector.

Formulation of the objectives of the article (statement of the research task). The objective of this study is the investigation of the alignment between workforce competencies and the current and emerging needs of agricultural enterprises, with a particular focus on improving cooperation between employers and vocational education institutions.

The relevance of this research is determined by the increasing imbalance between labor market demand and the supply of qualified personnel, intensified by



structural transformations in the economy, demographic challenges, and the impact of military aggression in Ukraine.

To achieve this objective, the study addresses the following tasks:

- (1) analysis of the current state of human resource provision in agricultural enterprises;
- (2) identification of key competency gaps in the labor force;
- (3) assessment of the interaction between enterprises and vocational education institutions;
- (4) development of proposals for improving cooperation mechanisms in workforce training.

The formulated objectives reflect a logical structure of the study and ensure consistency between the research problem, methodology, and expected outcomes. This approach emphasizes the scientific and practical significance of the topic and provides a basis for further analysis and conclusions.

**Results.** In the western regions of Ukraine, a segment of enterprises (10–15%) demonstrated an increase in production volumes compared to 2022. Large agricultural holdings completed 2023 with a slight decline in output; however, this did not significantly affect the implementation of their investment development strategies. According to expert assessments, the renewal of the agricultural machinery fleet slowed down; at the same time, imports of agricultural machinery decreased by approximately 30–35% by the end of the year. Considering that at the beginning of 2023 around 75–80% of enterprises were still equipped with modern machinery, these changes cannot be considered critical [2, p. 74].

A general trend in the development of the agricultural sector in recent years has been a reduction in the number of employees, driven by increased mechanization and organizational restructuring of production processes. At the same time, this situation increases the requirements for the professional training provided by higher education institutions (HEIs), which directly affects the quality of educational services in the context of labor market needs. In this regard, approaches to quality



management in higher education are becoming increasingly important as a mechanism for aligning educational outcomes with sectoral demands.

At present, experts do not identify strong prospects for further workforce reductions; in some cases, workforce expansion at enterprises is even anticipated.

The recruitment of skilled labor remains a key challenge for the agricultural sector. In 2023, most agricultural holdings experienced difficulties in hiring workers, primarily due to large-scale external migration and military mobilization. As a result, enterprises were forced to replace mobilized employees within a short period, which further emphasizes the need for closer coordination with HEIs in order to ensure the stability and quality of educational services aimed at workforce preparation.

The share of enterprises that hired employees in Ukraine in 2023 amounted to 77.1% of all enterprises. An analysis by enterprise size indicates that 31.9% of micro-enterprises, 58.1% of small enterprises, 76.5% of medium-sized enterprises, and 84.3% of large enterprises hired workers during this period. In the agricultural, forestry, and fishing sector, 71.5% of enterprises hired employees in 2023 [3, 4].

It is observed that large companies, responding to the urgent need to replace mobilized workers and the inability to fill vacancies promptly, have introduced internal training and retraining programs, including for women in traditionally male-dominated occupations. Among successful cases, enterprises report training programs for drivers and forklift operators.

On average in Ukraine, 42% of enterprises provided employee training, 40% did not conduct training activities, and 18% of enterprises were unable to provide a clear response. In agriculture, forestry, and fishing, only 40% of enterprises provided training, 41% did not, and 19% did not specify their status.

When analyzing enterprises by economic activity, more than half of those providing employee training were in the extractive industry (58%), healthcare (55%), energy, and education (53%). Less than 30% of enterprises providing training were engaged in information and telecommunications, construction, trade, arts, entertainment and sports, and real estate sectors.



## ACHIEVEMENTS OF THE ECONOMY: PROSPECTS AND INNOVATIONS

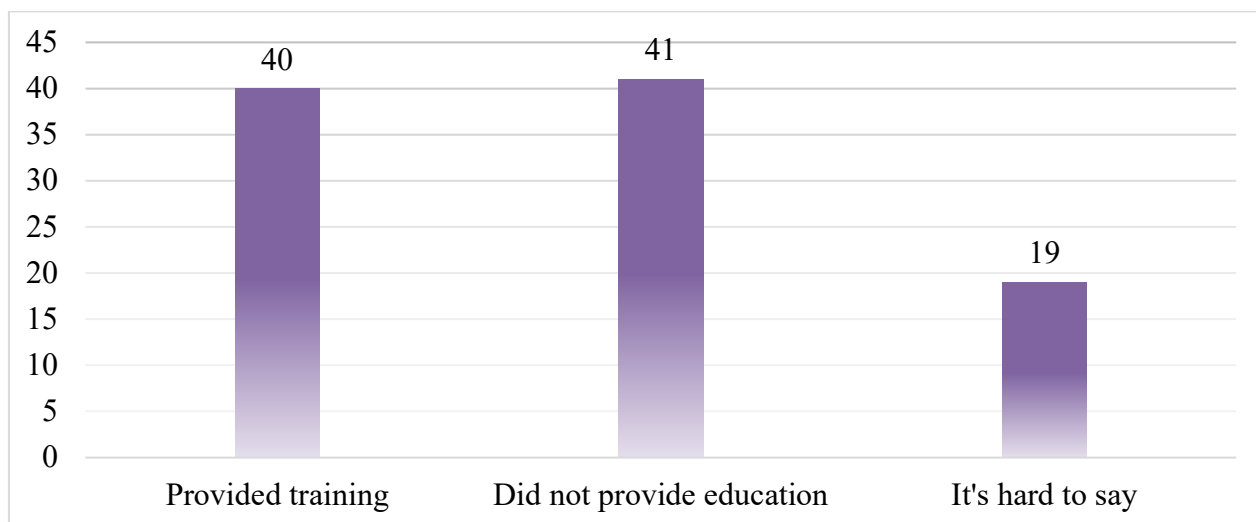


Fig. 1. Ratio of enterprises that provided employee training by type of economic activity, % [5]

Figure 1 illustrates the level of cooperation between enterprises and vocational and technical education institutions in the training of qualified workers across different types of economic activity. The presented data indicate that the agriculture, forestry, and fisheries sector ranks first in terms of the share of enterprises cooperating with vocational education institutions in the training of skilled workers among all types of economic activity

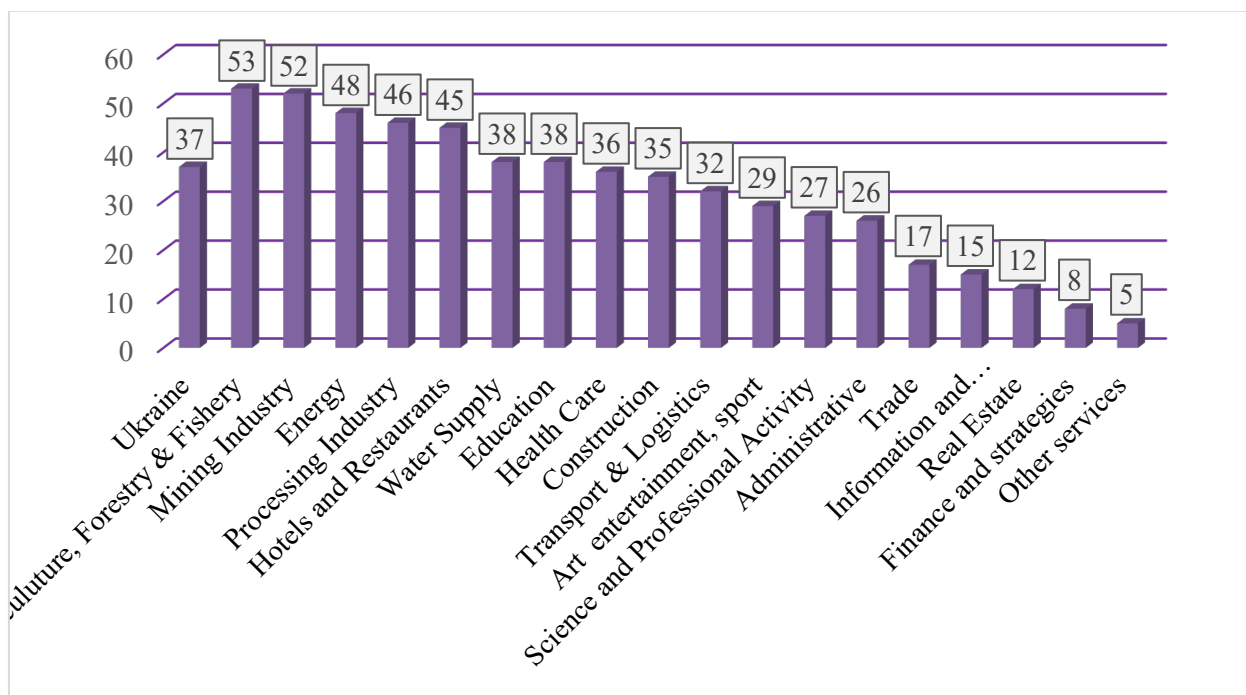


Fig. 2. Availability of cooperation with vocational and technical education institutions by type of economic activity, % [5].



By sector of activity, the largest share of enterprises reporting training needs in 2024 was observed in healthcare (49%), followed by mining, quarrying and energy (42%), education (36%), and manufacturing, as well as scientific, professional, and technical activities (33%). In 2024, 21% of employees in agriculture, forestry, and fisheries required training, while 41% did not, and the remaining 39% were classified as difficult to assess [5].

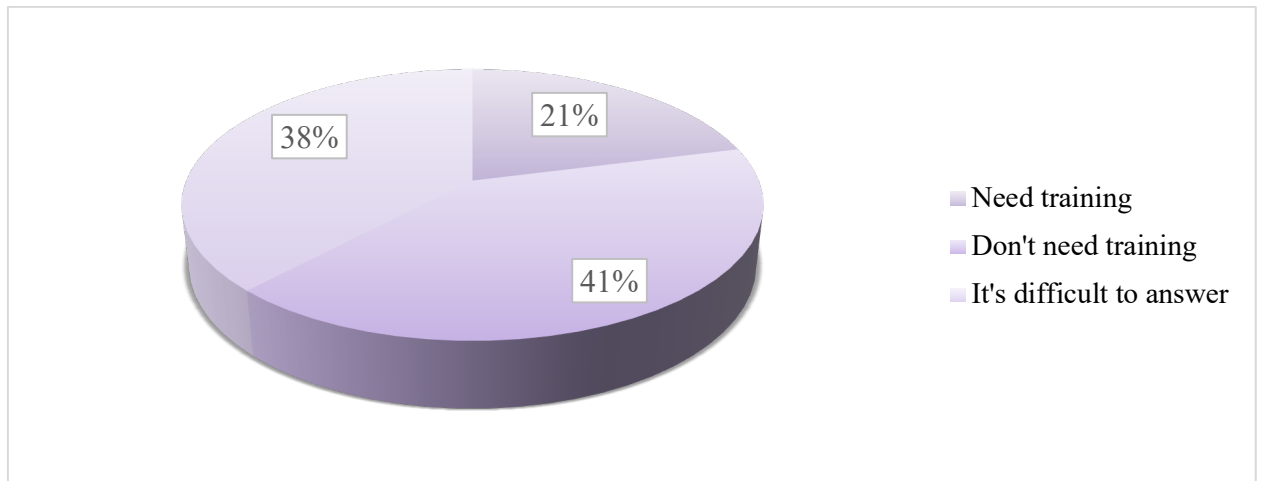


Fig. 3. Training needs of employees working in agriculture, forestry, and fisheries in 2024, % [5].

The assessment of the capacity for self-financing of training among agricultural, forestry, and fishery workers in 2024 demonstrates a differentiated distribution. A total of 12% of employees in this sector were willing to finance training and retraining at their own expense, whereas 48% indicated potential willingness. At the same time, 6% were not willing to finance training, 14% were rather unwilling to do so, and approximately one-fifth of respondents were unable to provide a definite answer [5].

Overall, the occupational structure in agricultural enterprises remains largely traditional and includes tractor drivers, machine operators, repair mechanics, welders, and personnel engaged in the maintenance and repair of complex agricultural machinery. These occupations have experienced a persistent labor shortage over several years. In addition, there is a deficit of employees with higher



education, particularly agronomists and engineers. Within the livestock sector, shortages are observed among veterinarians, zootechnicians, and specialists in artificial insemination for livestock and poultry [6].

Contemporary agricultural production imposes increasingly complex requirements on blue-collar workers, primarily associated with the ability to operate advanced machinery and modern technologies. The shortage of qualified personnel in machinery repair is partially compensated by service support provided by equipment suppliers. However, even service companies encounter considerable challenges in recruiting qualified staff, despite offering substantially higher wages compared to the agricultural sector [7, p. 101].

Employee requirements vary according to enterprise size, which determines the degree of specialization and functional expectations. Small enterprises typically require versatile specialists possessing broad knowledge of key agricultural processes and practical skills in operating compact machinery. By contrast, medium-sized enterprises demonstrate a demand for more specialized personnel with in-depth expertise in specific operational domains. For instance, operators of spraying equipment are expected to possess a thorough understanding of automated sprayer control systems, including sectional shut-off mechanisms, as well as the technological parameters governing spraying processes and their operational conditions, such as wind dynamics, nozzle selection, speed regulation, and pressure maintenance under varying terrain conditions [8, p. 9].

Contemporary tractor operators are expected to possess a comprehensive understanding of the agronomic aspects of technological operations and to perform these tasks independently without direct supervision. In addition, they are required to critically assess agronomists' instructions and, when necessary, provide well-reasoned feedback regarding their feasibility and potential limitations.

Large agricultural enterprises increasingly demonstrate demand for specialists in precision agriculture, autopilot systems, and navigation technologies, as well as



for professionals with advanced technical competencies and a high level of computer literacy.

The rapid dissemination of modern agricultural technologies in Ukraine has generated a growing demand for personnel capable of effectively implementing and utilizing these innovations. This situation places additional requirements on higher education institutions (HEIs) regarding the relevance of training programs and the quality of educational services they provide. In this context, approaches to quality management in higher education become crucial for ensuring alignment between graduate competencies and labor market needs.

The proportion of young employees in agricultural enterprises remains relatively low. In certain enterprises that actively promote youth employment, young workers account for up to 30% of the workforce. Overall, the limited participation of young professionals constrains the diffusion of advanced technologies in smaller enterprises, as more experienced workers often encounter difficulties adapting to digitalized and automated systems.

A key factor contributing to the insufficient quality of graduates and their mismatch with employers' requirements is the outdated material and technical base of educational institutions. This directly affects the quality of educational services in HEIs, forcing enterprises to provide additional training and upskilling for both graduates and newly hired staff. Experts also point to inadequate practical training during studies and the lack of modern competencies among industrial training instructors.

To address these challenges, expanding cooperation between educational institutions and equipment manufacturers has been proposed, along with the introduction of modern teaching technologies, simulators, and practice-oriented training tools, which would contribute to improving quality management processes in education.

The growing involvement of enterprises in dual education programs warrants particular attention. HEIs should place greater emphasis on aligning curricula with



employers' needs and labor market dynamics, while employers demonstrate readiness to support dual education by facilitating training programs, providing access to production facilities, and expanding internships and work placements. These measures collectively enhance the quality of educational services.

Consideration should also be given to the development of short-term training and upskilling courses for operators of mini-machinery, given that current training programs extend over 6 to 8 months. Educational institutions should address the diverse needs of both small and large agricultural enterprises. Training within the “Farmer” specialization, for example, should encompass the full cycle of agricultural production, from soil cultivation through harvesting to product marketing.

Special attention should be directed toward precision farming technologies, navigation systems, autonomous machinery, and specialized spraying equipment. Training programs should prioritize developing an integrated understanding of production processes, technological tools, and their influence on operational outcomes.

Employers additionally express dissatisfaction with existing mechanisms for organizing work placements, particularly with respect to tax regulations and indirect costs associated with hosting trainees, which further indicates the need for improved quality management in cooperation between HEIs and enterprises.

**Conclusions.** Agricultural enterprises demonstrate the highest demand for employees capable of working with modern machinery, equipment, and digital tools. This demand reflects the ongoing modernization of the agricultural machinery fleet and the rapid diffusion of advanced agricultural technologies, which also increases requirements for training provided by higher education institutions (HEIs) and influences the quality of educational services.

Of particular significance is the growing importance of digital literacy and foreign language proficiency. Both competencies are essential for working with technical documentation for modern equipment, which is frequently available only



in foreign languages, as well as for continuous professional development and the implementation of innovative technologies. The demand for foreign language skills is further reinforced by manufacturers' expansion into international markets.

Furthermore, deficiencies in certain areas of knowledge and skills can be partially offset by a responsible attitude toward work and a willingness to learn from more experienced colleagues. Responsibility is especially critical in agricultural contexts given the high cost of modern equipment and the potential for substantial financial losses resulting from damage or misuse.

Taken together, these trends highlight the need for strengthening quality management in higher education, ensuring that HEIs more effectively align learning outcomes with labor market requirements. The importance of these competencies is projected to increase as technological advancement continues and the structural transformation of the agricultural sector progresses, further emphasizing the role of quality of educational services in workforce preparation.

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