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# Leading Entrepreneurial Futures: Innovating Higher Education with European Practices for Tomorrow's Business Leaders

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**ABSTRACT**

The processes of globalisation, digitalisation and increased competition in the international labour market are leading to an increase in the role of entrepreneurial competence among modern professionals. Therefore, the article aims to study innovative technologies for training future specialists for entrepreneurship in European educational practice and identify trends that should be implemented in Ukrainian higher education institutions. The article examines strategies for developing entrepreneurial competence. It analyses pedagogical technologies for training future specialists for entrepreneurship in European educational practice, using examples from EU countries such as Norway, Germany, Austria, Portugal, Croatia, and the Czech Republic. The study used the following methods: analysis of literature and practical cases of EU countries' experience in preparing higher education students for entrepreneurship, questionnaire survey of experts to identify the most effective strategies and technologies of vocational education that should be implemented in the educational process of Ukrainian higher education institutions, and statistical calculation of the effectiveness of acquiring entrepreneurial competence using the selected technologies. The results of a preliminary expert assessment of the prospects for implementing strategies for training future specialists for entrepreneurship from European practice in the conditions of Ukrainian higher education institutions have shown the high efficiency of integrating digital and entrepreneurial skills, practice-oriented learning, digitalisation of education and dual education. To confirm the hypothesis about the effectiveness of the formation of entrepreneurial competence using the outlined innovative technologies, criteria and their indicators have been developed. The criterion-based assessment of the formation of entrepreneurial competence before and after the introduction of European experience in using innovative technologies for training specialists has made it possible to assert the feasibility of their use. According to the expert assessment, confirmed by the statistical calculation according to the Student's criterion, the formation of entrepreneurial competence of higher education students after introducing European practices of training specialists for entrepreneurship is effective and promising. Recommendations for further implementation of the European experience in training future specialists for entrepreneurship using innovative technologies are also provided. It is determined that the use of European practices of applying innovative technologies for training future specialists for entrepreneurship is a key way to train qualified personnel, promote economic development and improve the level of the education system.

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An important aspect of modern European practice is introducing innovative technologies to prepare future professionals for entrepreneurship. The development of the global economy and transformational processes of society require higher education students to develop entrepreneurial competence. In preparing students for entrepreneurship, considerable attention is paid to applying innovative approaches to teaching, introducing practice-oriented teaching methods and preparing future specialists for independent professional activity. Therefore, there is a need to introduce the latest approaches and strategies aimed at developing entrepreneurial thinking in the educational process.

The European Union's economic development requires specialists who can actively develop their own entrepreneurial projects, adapt to changes in the labour market, and focus on maintaining competitiveness and implementing their own business initiatives. The development of online education technologies, artificial intelligence technologies, and the overall digitalisation of the educational process opens up the possibility of introducing innovative technologies to train specialists. Therefore, given the above factors, there is a need

to create educational programmes that focus on developing entrepreneurial competence and the ability of higher education students to implement innovative projects.

However, despite the relevance of innovative technologies for training specialists for entrepreneurship, several problems arise, including the need for a sufficient number of highly qualified teachers and close cooperation with stakeholders who can pass on practical entrepreneurial experience to higher education students. Another important aspect of this issue is the development of the infrastructure of higher education institutions for the development of start-ups and the introduction of digital technologies. Therefore, integrating entrepreneurial education into educational programmes is an important step towards implementing innovative programmes in educational practice.

The article is devoted to studying innovative technologies for training future specialists in entrepreneurship in European educational practice and identifying the trends that should be implemented in Ukrainian higher education institutions.

## Literature Review

Myhovich (2019) outlines the need for international integration and mobility to develop the entrepreneurial competence of higher education students and create a global learning environment. Trishch et al. (2023) compare the economic development of EU countries, assessing various factors that affect economic performance. It is determined that an important factor is the introduction of innovative technologies for training future professionals for entrepreneurship. Mebert et al. (2020) consider the possibilities of an interdisciplinary approach in higher education and its impact on forming future professionals' readiness for entrepreneurship. It is determined that such an approach improves learning outcomes and increases the readiness of higher education students to meet the challenges of the modern labour market.

The study by Afriliana et al. (2023) outlines the introduction of innovative technologies in training future specialists, mainly using an intelligent decision-making system based on artificial intelligence to train higher education students in studying entrepreneurship and management systems. Babenko et al. (2022) consider implementing a blended learning system in teaching entrepreneurship for higher education students in engineering. Baruah and Mao (2021) examine innovative means of teaching entrepreneurship to higher education students; in particular, they study a business simulation game tool used to develop entrepreneurial competence for higher education students in engineering, which is important for orientating such specialists in actual business tasks. Oliynyk et al. (2020) outline the use of the STEM approach in developing the entrepreneurial competence of future engineers and emphasise the strengthening of educational programmes in the context of using this approach.

Castañó-Muñoz and Rodrigues (2021) examine the impact of taking massive open online entrepreneurship courses on the business skills of higher education students and their future career prospects and employment. Diaz et al. (2020) consider participation in online entrepreneurship courses as one way of non-formal education. Mazaraki et al. (2021) emphasise the need to modernise university curricula, particularly the need for an integrated approach and the development of entrepreneurial competence of higher education students.

Pappa et al. (2021) analysed engineering education in Europe. They found that implementing the European Qualifications Framework in different national structures has led to differences that can both have negative consequences in terms of quality of education and be used to obtain a positive effect of training specialists for national economies. Petkov (2023) investigates the advantages of two pan-European approaches to developing learning content and assessing achievements – the European Credit System for Vocational Education and Training (ECVET) and microcredits. Trends towards more dynamic content design in smaller learning units are identified. Mallion et al. (2021) investigated the role of educational neuroscience in learning through the perspectives of adult learners in vocational education. They identified the positive impact of innovative learning technologies on the quality of education.

Mondego and Aziz (2024) emphasise the potential of innovative technologies and artificial intelligence in education, particularly for simulating situations in preparing specialists for entrepreneurship and reducing the amount of routine work in education. Ma (2023) outlines the construction of an experimental practical system of statistics curriculum in the School of Statistics at Shanxi University of Finance and Economics based on smart teaching, “Internet + Education,” and innovative entrepreneurial education. The Statistical Experimental Teaching System integrates innovative entrepreneurial education with the new Internet + Education teaching methodology and is based on the principles of smart teaching. Its main goal is to promote the organic integration between innovation and entrepreneurship education and statistical experimental practical courses. Su et al. (2024) note that business English programmes need to be integrated with innovation and entrepreneurship education to help students hone their international communication skills and innovative thinking to meet the challenges of the modern business world. La Rubia et al. (2022) have developed and implemented projects to promote entrepreneurial culture in the context of higher education. It is determined that sustainable entrepreneurship will be the basis for enabling students to learn in three dimensions that include sustainability: environmental, economic, and social.

Anca et al. (2020) noted that when teaching today’s higher education students, teachers should focus on active learning and problem-based learning methods and integrate entrepreneurship much more into course curricula. Bi et al. (2021) created a research model of the impact of a virtual simulation experiment on innovation and entrepreneurial abilities. They analysed the internal mechanism of the model’s influence and verified the effect of knowledge acquisition on innovation and entrepreneurial ability in the virtual simulation experiment. Aijun (2020) suggests that to improve the effect of teaching a course on innovation and start-ups, a method for evaluating the effect of teaching a course based on big data analysis should be introduced and applied to further prepare specialists for entrepreneurship and risk analysis. Dastgheib-Beheshti and Nizich (2023), based on the Entrepreneurship and Technology Innovation Centre (ETIC), have created programmes to prepare students for conceptual and practical experience. In the context of the study, it was determined that entrepreneurship and entrepreneurial thinking are essential skills for future technology professionals.

## Method

The study of innovative technologies for preparing future specialists for entrepreneurship included an analysis of the most successful cases of implementation of these technologies in European educational practice and possible ways of their implementation in higher education institutions of Ukraine. In the first stage, an analysis of European practices of applying innovative technologies for the formation of entrepreneurial competence of higher education students and strategies for preparing future professionals for entrepreneurship was carried out. The study was conducted in 2023–2024 at the Institute of Professional Education of the National Academy of Pedagogical Sciences of Ukraine and National Transport University. The next step was to identify the most successful European practices of implementing innovative technologies for training future specialists for entrepreneurship by questioning an expert group and assessing the prospects for their application in the realities of Ukrainian higher education on a 12-point scale.

During the 2023-2024 academic year, the selected strategies for training future specialists for entrepreneurship and innovative technologies for forming entrepreneurial competence, selected based on an analysis of European educational practices, were introduced into the educational process. The study outlines the criteria for determining the effectiveness of training future specialists for entrepreneurship through innovative technologies. By these criteria, the strategies for training future specialists for entrepreneurship in European practice were evaluated with a view to their implementation in Ukrainian higher education institutions. The assessment was carried out by questioning according to the criteria on a 12-point scale by questioning members of the expert group, which included researchers from the Department of Education and Professional Career of the Institute of Professional Education of the National Academy of Pedagogical Sciences of Ukraine and research and teaching staff of National Transport University in total of 26 people ([Appendix 1](#)).

The final stage was the evaluation of the effectiveness of the implementation of European practices of introducing innovative technologies for training future specialists for entrepreneurship in the context of vocational education in Ukraine. A comparison of the input and results after the practical implementation of European educational practices in the educational process was carried out and a statistical calculation was made according to the Student's criterion. Based on the analysis of European practices of training future specialists for entrepreneurship and assessment of the prospects for their implementation in Ukraine, recommendations on further ways of their implementation and expected results are formed.

## Results

Entrepreneurial competence is one of the key competences of a competitive specialist in the modern labour market; it is an integral psychological quality of a personality that manifests itself in the motivated ability to creatively search for and implement new economic ideas and allows solving various problems in everyday, professional and social life. EU countries actively use innovative technologies in vocational education, including those that prepare future professionals for entrepreneurship. Examples of such countries as Germany, Austria, Czech Republic, Norway, Portugal, and Croatia demonstrate the effective use of innovative technologies for training future professionals for entrepreneurship, which leads to an increase

in the quality of training of competitive professionals who meet the needs of the modern market. [Table 1](#) presents an analysis of strategies for developing entrepreneurial competence and pedagogical technologies for training future specialists for entrepreneurship in European educational practice.

**Table 1**

*Analysis of Strategies for the Development of Entrepreneurial Competence and Pedagogical Technologies for Training Future Professionals for Entrepreneurship in European Educational Practice*

Country	Strategies for developing entrepreneurial competence	Pedagogical technology for training future specialists
EU		
Norway	Development of sustainable youth entrepreneurship	Implementation of sustainable entrepreneurship courses in educational programmes
	Development of project management skills	Public-private partnerships for sustainability-related start-ups
		Integration of business simulation technologies
		Providing internship opportunities and support for start-ups
Portugal	Acceleration programmes	Providing access to financial support and mentoring
		Establishment of business incubators at higher education institutions
	Integrating digital and entrepreneurial skills	Holding demo days and start-up hackathons
		Development of digital educational environments, use of information and communication tools for learning
Croatia	Digitalisation of education	Development of digital simulations for business skills development.
		Implementation of VR and AR for simulating situations in business
	Practice-oriented training and international cooperation	Participation in international business projects
		Taking online courses to develop entrepreneurial skills
Germany	Dual education	Participation of entrepreneurs in the development of educational programmes
		Combining theory and practice at enterprises
	Start-up incubators	Development and implementation of business ideas at universities
		Public-private partnerships
Austria	Innovative technologies	Application of AI and big data for project implementation
		Partnership programmes with technology corporations
	Interdisciplinary systematic approach	Establish start-up support centres at higher education institutions and attract investors
		Conducting entrepreneurship courses for various specialities
Czech Republic	Cluster initiatives	Involvement of mentors and experts to share experience
		Work of higher education students on real projects together with business
	International cooperation	Creation of cross-border educational programmes
		Participation in international grant training programmes

*Source:* Compiled by the authors based on the works of researchers (Dastgheib-Beheshti & Nizich, 2023; Nenko et al., 2021; Pařová & Vejačka, 2020; Pappa et al., 2021; Petkov, 2023; Tyukhtenko, 2017; Tyukhtenko et al., 2021; Voldsund et al., 2020)

Norway's entrepreneurial competence development strategies focus on youth entrepreneurship and business simulation technologies. For example, the Young Enterprise Norway platform aims to develop innovative thinking and project management. Developing sustainable entrepreneurship based on public-private partnerships is also important, meaning that higher education institutions cooperate with private companies and support start-ups. Portugal focuses on implementing acceleration programmes for young people, such as Start-up Portugal, which provides students with access to mentoring and financial support. Popular strategies for developing entrepreneurial competence include using business incubators and accelerators at higher education institutions. Demo days for entrepreneurship and hackathons are also standard. Higher education institutions actively use digital and information and communication technologies to develop entrepreneurial readiness in future professionals.

Croatian educational institutions integrate practice-oriented approaches, in which students learn to adapt to market changes, master innovative technologies and participate in



international projects, for example, based on Erasmus+. The educational process is also being digitalised, with virtual and augmented reality being used to model business situations and digital simulators and online platforms for developing entrepreneurial skills. In Germany, future specialists are trained for entrepreneurship through the active implementation of dual education, which complements the theoretical knowledge gained in higher education institutions with practical reinforcement of the knowledge gained at enterprises. Companies are actively involved in developing educational programmes, and funding is provided through public-private partnerships. Start-up incubators are also being set up at higher education institutions; for example, the Gründungsbüro allows students to implement entrepreneurial ideas using innovative technologies.

Austria widely uses digital technologies, such as artificial intelligence and big data, to introduce innovative technologies to prepare future specialists for entrepreneurship. Investors and technology corporations are involved in the operation of business incubators and start-up support centres at higher education institutions, which ensures a high level of training for higher education students. The Czech higher education system is focused on international cooperation, with higher education students actively participating in European grant programmes and mentors and specialists from other countries being involved in the exchange of experience. Cluster initiatives are also widely used, in which students implement entrepreneurial initiatives together with businesses, which effectively influences the development of entrepreneurial competence.

Adapting higher education students to the labour market requires the use of innovative technologies in vocational education. European experience can be implemented to improve the educational systems of other countries, taking into account the specifics of their social and economic conditions. Therefore, the next step in the study is to identify the most effective European strategies for training future professionals for entrepreneurship, which would be appropriate to implement in Ukraine.

Based on the Institute of Professional Education of the National Academy of Pedagogical Sciences of Ukraine and the National Transport University, a survey was conducted among experts on the prospects for implementing strategies for training future specialists in entrepreneurship from European practice in the conditions of higher education institutions of Ukraine, the results of which are presented in [Table 2](#). It was proposed to assess the level of prospects for implementing the strategies outlined in [Table 1](#). The level ranged from 0 to 12, where 0–4 are low-level indicators, 5–8 are medium-level indicators, and 9–12 are high-level indicators. The high level (HL) of implementation of strategies for training future specialists in entrepreneurship from European practice in the educational process of higher education institutions of Ukraine is characterised by vast opportunities for integration, support at the state level and relevance to society. The medium level (ML) is characterised by partial integration practice and the need for support from the state and private enterprises. In contrast, the need for significant preliminary reforms for implementation characterises the low level (LL).

**Table 2**

*Results of the Survey on the Prospects of Implementing Strategies for Training Future Professionals for Entrepreneurship from European Practice in Higher Education Institutions of Ukraine*

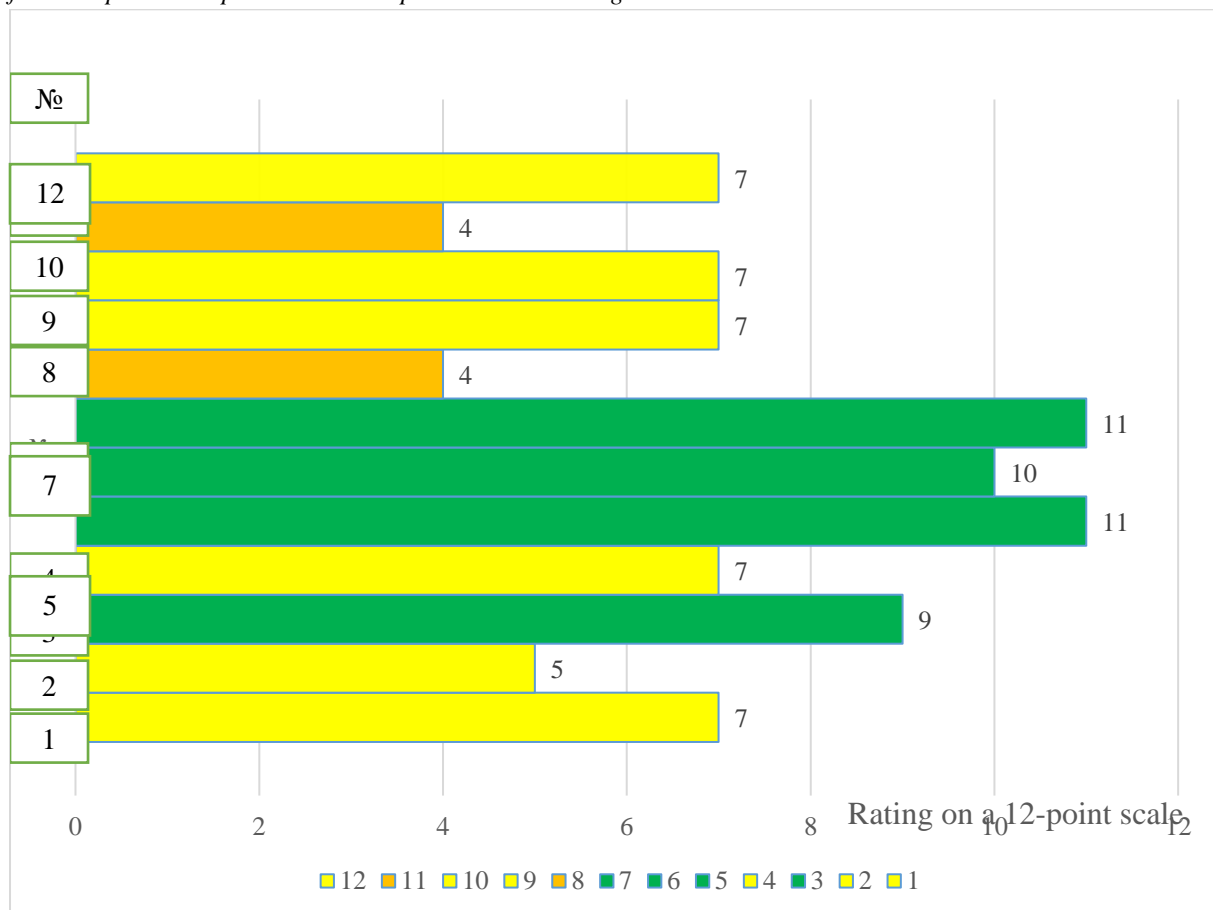
No	Pedagogical technology for training future specialists	Level	Level indicator
1	Development of sustainable youth entrepreneurship	ML	7
2	Development of project management skills	ML	5
3	Integrating digital and entrepreneurial skills	HL	9
4	Acceleration programmes	ML	7
5	Practice-oriented learning	HL	11
6	Digitalisation of education	HL	10
7	Dual education	HL	11
8	Start-up incubators	LL	4
9	Innovative technologies	ML	7
10	Interdisciplinary systematic approach	ML	7
11	Cluster initiatives	LL	4
12	International cooperation	ML	7

*Note.* HL, ML, and LL, respectively, high, medium and low levels of implementation prospects

Figure 1 shows a visualisation of the survey results regarding the prospects for implementing strategies for training future specialists for entrepreneurship based on European practice in Ukrainian higher education institutions on a 12-point scale.

**Figure 1**

*Visualisation of the Survey Results on the Prospects of Implementing Strategies for Training Future Specialists for Entrepreneurship Based on European Practice in Higher Education Institutions*



*Note.* Keywords: 1-development of sustainable youth entrepreneurship, 2-development of project management skills, 3-integration of digital and entrepreneurial skills, 4-acceleration programmes, 5-practice-oriented learning, 6-digitalisation of education, 7-dual education, 8-startup incubators, 9-innovative technologies, 10-interdisciplinary systemic approach, 11-cluster initiatives, 12-international cooperation

**Source:** Developed by the authors



The visualisation of the survey results shows that cluster initiatives and start-up incubators have shown low prospects for implementation in Ukrainian higher education institutions, which may be due to the insufficient material and technical level of higher education institutions and the complexity of cluster interaction with enterprises. The development of sustainable youth entrepreneurship, project management skills, acceleration programmes, innovative technologies, an interdisciplinary systemic approach, and international cooperation received medium-level indicators, which indicated that these strategies require support from state and private enterprises. Integration of digital and entrepreneurial skills, practice-oriented learning, digitalisation of education and dual education showed high prospects for implementation. It is proposed that high-level strategies in experimental development be introduced and the effect of entrepreneurial competence development from their implementation be evaluated.

To assess them, criteria have been developed: the relevance of educational programmes to labour market conditions, the frequency of digital technologies in the educational process, the use of public-private partnerships and support for youth entrepreneurship. The expert group assessed strategies for implementing European experience in using innovative technologies to prepare future professionals for entrepreneurship per the criteria outlined above. The assessment was conducted using a questionnaire; [Appendix 1](#) contains a 12-point scale questionnaire. [Table 3](#) presents the criteria and indicators for determining the effectiveness of the formation of higher education students' entrepreneurial competence through innovative technologies.

**Table 3**

*Criteria and Indicators for Determining the Effectiveness of the Formation of Entrepreneurial Competence of Higher Education Students Through the Use of Innovative Technologies*

Designation	Criterion	Indicator
C1	Relevance of educational programmes to current market conditions	Availability of disciplines and modules covering the use of innovative technologies to prepare future professionals for entrepreneurship Participation of higher education students in international internships and experience exchange programmes Share of higher education students applying the acquired knowledge in practice
C2	Application of digital technologies in the educational process	Integration of learning platforms and non-formal education for entrepreneurship education Consideration of practical cases and simulation business games based on the use of digital tools Application of a monitoring system for completing entrepreneurship assignments
C3	Developing entrepreneurial competence through public-private partnerships	Implementing educational initiatives together with business Involvement of entrepreneurs in mentoring and expert evaluation of projects of higher education students Conducting internships and work placements at enterprises to develop business skills
C4	Practical readiness for entrepreneurship	High level of independence of higher education students in the development of entrepreneurial projects and developments Development of strategic financial planning skills Developing the ability of higher education students to analyse market conditions

According to these criteria, based on compliance with the outlined indicators, it is possible to systematically assess the effectiveness of innovative technologies in forming entrepreneurial competence in higher education students. [Table 4](#) presents the results of the criterion-based assessment of the implementation of the European experience of applying innovative

technologies for training specialists in entrepreneurship. Strategies were selected for further implementation, the level of prospects for implementation was determined to be high, and the formation of entrepreneurial competence from their implementation was assessed.

The experimental design was used to develop entrepreneurial competence in Master's degree students. It included four modules that meet the strategies' objectives with high implementation prospects. The first module aims to digitalise the educational process and work in a digital learning environment to prepare higher education students for entrepreneurship. The lecturers delivered a series of lectures on working with data analytics, cloud services, and the introduction of artificial intelligence tools in entrepreneurship.

The second module outlined the integration of digital and entrepreneurial skills. It aimed to develop market analysis and entrepreneurial project management skills and competences in the digitalisation of entrepreneurship. During the module, higher education students had to analyse successful business start-up cases, research web applications and online services used in entrepreneurial activities, and develop and defend a business project using digital tools: analytical platforms and CRM. As part of the support provided by the experts, online consultations were held with experts in the digital transformation of entrepreneurship and the opportunity to provide mentoring from entrepreneurs. Business experts also held a webinar.

The third module was designed for practice-oriented learning, which involves applying theoretical knowledge to practice. The students underwent mini-internships at business companies, during which they participated in solving the companies' business problems under the guidance of mentors. As a preliminary preparation for this activity, they received coaching on the methodology of solving practice-oriented tasks.

The last module was based on integrating learning and work in an enterprise environment. The students participated in the development of entrepreneurial projects together with business representatives and took part in fundamental business processes. During these developments, company representatives mentored and evaluated students' entrepreneurial activities. Integrating theoretical and practical training, supporting higher education students by representatives of enterprises, and ensuring students' mastery of innovative business process technologies ensured the effective development of their entrepreneurial competence.

**Table 4**

*The Results of the Criterion Evaluation of the Formation of Entrepreneurial Competence Before and After the Introduction of the European Experience of Applying Innovative Technologies for Training Specialists*

No strategies	Before the introduction of innovative technologies					After the introduction of innovative technologies				
	1	2	3	4	Average	1	2	3	4	Average
C1	7	6	5	4	5,50	11	9	10	8	9,50
C2	5	7	4	5	5,25	9	11	9	8	9,25
C3	4	6	8	3	5,25	8	8	11	9	9,33
C4	4	6	4	6	5,00	8	9	8	10	8,75
Average	5.00	6.25	5.25	4.50	5.25	9.00	9.25	9.50	8.75	9.21

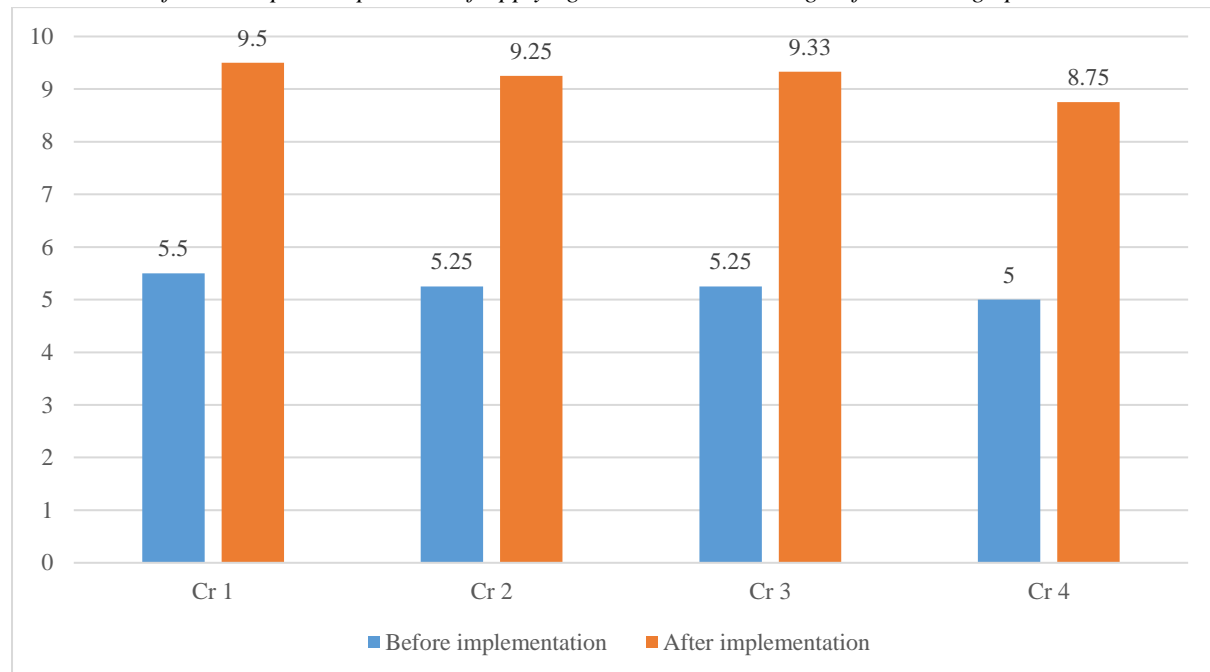
*Note.* C1, C2, C3, C4 - evaluation criteria, 1- integration of digital and entrepreneurial skills, 2- practice-oriented learning, 3- digitalisation of education, 4- dual education

Based on the data presented in [Table 4](#), it can be concluded that after the introduction of the European experience of applying innovative technologies for training specialists, the average indicator for the four evaluation criteria, namely the relevance of educational programmes to the labour market, the frequency of use of digital technologies in the educational process, the

use of public-private partnerships and the development of practical readiness for entrepreneurship increased from 5.25 to 9.21, which indicates the effectiveness of the application of these practices in the formation of entrepreneurial competence. Figure 2 shows the visualisation of the criterion evaluation of the formation of entrepreneurial competence before and after introducing the European experience of applying innovative technologies of training specialists.

**Figure 2**

*Visualisation of the Criterion Evaluation of the Formation of Entrepreneurial Competence Before and After the Introduction of the European Experience of Applying Innovative Technologies for Training Specialists*



*Note.* C1 - relevance of educational programmes to labour market conditions, C2 - frequency of use of digital technologies in the educational process, C3 - use of public-private partnerships, C4 - development of practical readiness for entrepreneurship

*Source:* Developed by the authors

The last stage of verifying the effectiveness of the implementation of the European experience of applying innovative technologies for training specialists for entrepreneurship was a statistical assessment of the formation of entrepreneurial competence of higher education students before and after the introduction of European practices of training specialists for entrepreneurship, taking into account the assessment of each of the 26 experts, which is presented in Table 5.

The student's criterion was applied to statistically calculate the formation of entrepreneurial competence of higher education students before and after the introduction of European practices of training specialists for entrepreneurship. The critical values for the sample with  $n = 26$  are:  $\rho \leq .05 = 2$ ;  $\rho \leq .01 = 2.68$ .

With the obtained empirical value of  $\text{temp} = 10.8$ , we can conclude that, according to the expert assessment, the formation of entrepreneurial competence of higher education students after the introduction of European practices of training specialists for entrepreneurship is effective and promising.

**Table 5**

*Statistical Assessment of the Formation of Entrepreneurial Competence of Higher Education Students Before and After the Introduction of European Practices of Training Specialists for Entrepreneurship*

No expert	Samples		Deviation from the average		Deviation squares	
	B.1	B.2	B.1	B.2	B.1	B.2
1	3	9	-2.5	-0.5	6.25	0.25
2	5	9	-0.5	-0.5	0.25	0.25
3	3	10	-2.5	0.5	6.25	0.25
4	5	11	-0.5	1.5	0.25	2.25
5	8	9	2.5	-0.5	6.25	0.25
6	3	8	-2.5	-1.5	6.25	2.25
7	5	10	-0.5	0.5	0.25	0.25
8	7	9	1.5	-0.5	2.25	0.25
9	3	11	-2.5	1.5	6.25	2.25
10	8	10	2.5	0.5	6.25	0.25
11	4	8	-1.5	-1.5	2.25	2.25
12	7	10	1.5	0.5	2.25	0.25
13	6	9	0.5	-0.5	0.25	0.25
14	4	9	-1.5	-0.5	2.25	0.25
15	8	11	2.5	1.5	6.25	2.25
16	5	10	-0.5	0.5	0.25	0.25
17	6	10	0.5	0.5	0.25	0.25
18	4	9	-1.5	-0.5	2.25	0.25
19	6	8	0.5	-1.5	0.25	2.25
20	7	11	1.5	1.5	2.25	2.25
21	4	10	-1.5	0.5	2.25	0.25
22	6	9	0.5	-0.5	0.25	0.25
23	8	9	2.5	-0.5	6.25	0.25
24	5	10	-0.5	0.5	0.25	0.25
25	6	10	0.5	0.5	0.25	0.25
26	7	8	1.5	-1.5	2.25	2.25
Sums	143	247	0	0	70.5	22.5
Average	5.5	9.5				

*Note.* B1 - assessment of the formation of entrepreneurial competence of higher education students before introducing European practices of training specialists for entrepreneurship; B2 - assessment of the formation of entrepreneurial competence of higher education students after introducing European practices of training specialists for entrepreneurship.

The final part of the study was to provide recommendations for further implementing the European experience of training future professionals in entrepreneurship using innovative technologies. [Table 6](#) summarises these recommendations.

**Table 6**

*Recommendations for Further Implementation of the European Experience of Training Future Specialists for Entrepreneurship Using Innovative Technologies*

Strategy for training specialists	Strategy implementation technology	Ways of implementation	Expected results
Use of innovative digital tools	Implementation of innovative teaching tools for entrepreneurship courses. Transition to digital technologies.	Use of digital educational platforms and learning tools. Implementation of simulation tools for business management. Modelling business processes using AR and VR.	Increasing the level of entrepreneurial competence of higher education students.
Dual education and development of cooperation with enterprises.	Developing and implementing joint programmes with businesses to integrate work and study. Conducting internships at business enterprises.	Involvement of business professionals in the development of educational programmes. Encourage businesses to cooperate with higher education institutions.	Building long-term relationships between education, business and government institutions.
Formation of business accelerators at higher education institutions	Involve private enterprises and public institutions in financing educational start-ups.	Formation of support for private enterprises to implement business	Increase the number of start-ups developed by future professionals with the involvement of

	Develop a framework of regulations to stimulate public-private partnerships.	incubators and accelerators based on higher education institutions. Organising start-up competitions with funding from private partnership enterprises.	enterprises and higher education institutions.
Cooperation with foreign educational institutions	Development of international partnerships. Search for EU funding grants.	Participation in European educational programmes. Exchange of experience with European higher education institutions.	Increasing the prestige of Ukrainian higher education institutions in the international community.

Given the recommendations on introducing European experience in training future specialists for entrepreneurship using innovative technologies, it is determined that implementing the best European practices can become a powerful means of developing Ukrainian entrepreneurial education and improving the economy.

## Discussion

Researchers Yanli and Danni (2021) analysed the European Union's Digital Education Action Plan (2021–2027) and considered the prospects for vocational education in the digital age. It is noted that the rapid development of digital technologies has a profound impact on the social economy, and digital technologies contribute to the popularisation and promotion of digital education while creating innovative learning environments. The article outlines the need to improve vocational education and promote its digital transformation to meet the rapidly changing structure of the economy and changes in labour market demand. Paľová and Vejačka (2020) noted the improvement in the quality of entrepreneurial education by training teachers of higher education institutions in information and communication technologies. The researchers noted that the unemployment rate among young people is almost twice as high as that of other groups of EU citizens. The article outlines the ReStart project, based on the EU's Erasmus+ funding scheme for education, which aims to strengthen students' and teachers' entrepreneurial and digital skills to enhance the modernisation of higher education in Moldova. Its main goal is to provide innovative entrepreneurship education in line with EU best practices and local market expectations with a better understanding of relevant entrepreneurship and digital learning needs of students, teachers and local companies. The paper notes improving the quality of education by introducing innovative technologies and new pedagogical approaches based on information and communication technologies. Thus, it can be concluded that forming entrepreneurial competence is one of the key trends in European educational practice. However, training personnel for the labour market that would meet the present requirements requires highly qualified teachers.

The paper notes that today, education systems in the European Union use mobility and projects focused on international cooperation. In this global environment, secondary vocational schools, apprenticeships, higher education institutions and research centres must create a common communication platform to share information, experiences, best practices, incentives and ideas for creating and managing a complex education system for the relevant technical workforce. North et al. (2021) presented the development of a platform that teachers can use to find, create and share learning resources based on gamified content, which was created within the Erasmus+ GATE: VET project. The platform consists of an online wiki and a mobile application. It helps educators understand the theoretical and practical aspects of gamified

learning and apply them to develop the entrepreneurial competence of higher education students. Romero-Gázquez et al. (2022) analyse the current state of Industry 4.0 implementation from the perspective of industry, entrepreneurs and future professionals. The authors emphasise the lack of Industry 4.0 competences in higher vocational education curricula. The authors present the European innovative learning initiative IN4WOOD, a successful open and free learning tool designed to offer students, employees and managers an easy way to learn, use and deploy key Industry 4.0 competences. The learning tool consists of more than 300 training videos, increasing the competitiveness of employees, managers and entrepreneurs. Thus, introducing innovative technologies to prepare future professionals for entrepreneurship requires developing skills in working with modern information and communication technologies, artificial intelligence, and data processing, which is both a challenge and an impetus for the development of modern education.

Voldsund et al. (2020) outline an innovative educational approach to problem-based learning using real-life tasks for entrepreneurship education at the Faculty of Engineering and Science at the University of Applied Sciences of Western Norway (HVL-FES) and at the Faculty of Natural and Marine Sciences at the University of Southeast Norway (USN-NMT) in entrepreneurship courses. The need to strengthen the link between sustainable development and entrepreneurship education has been identified. Universities should develop courses that are structured to combine learning and real-life projects within the framework of entrepreneurship and education. Therefore, key topics for study in such courses are entrepreneurship, innovation and sustainability, which allows for the structure and development of cooperation networks and leads to new sustainable ideas. The work of Rus-Casas et al. (2024) highlights the relevance of promoting an entrepreneurial culture among university students through projects developed in classroom activities to motivate and educate future entrepreneurs and develop practical skills and business knowledge. The main focus is on introducing mentors to build entrepreneurial competence through conferences, coworking spaces, and the use of social media. The experience has been satisfactory, strengthening cooperation between the university, companies and technology centres. The presence of mentors motivated students to participate in entrepreneurial initiatives and focus their qualification work on innovative ideas. Thus, training future professionals for entrepreneurship requires introducing innovative technologies, a focus on sustainable development and European educational practices, and an interdisciplinary approach.

## Conclusion

Integrating innovative technologies, such as digitalisation, information and communication technologies, and public-private partnerships, has proven to be effective in training future specialists for entrepreneurship in European educational practice. The article analyses strategies for developing entrepreneurial competence and pedagogical technologies for training future specialists for entrepreneurship in European educational practice. The experience of such EU countries as Croatia, Germany, Portugal, Czech Republic, Norway and Austria is considered. The best practices that should be implemented to train higher education students in Ukraine are highlighted.

The use of online learning platforms and business simulations has a positive impact on developing practical skills. It allows for the modelling of business situations, which allows

students to quickly adapt to the challenges of the modern labour market and improves the quality of education in general. The exchange of experience within the framework of international cooperation opens up opportunities for developing entrepreneurial projects and implementing the best initiatives. Practice-oriented education, the main tools of which are business incubators at higher education institutions and dual education, ensures better integration of students into the business environment.

Based on the Institute of Vocational Education of the National Academy of Pedagogical Sciences of Ukraine and the National Transport University, the efficiency of training future specialists for entrepreneurship through implementing innovative technologies of European educational practice was determined. Based on the previously outlined criteria for determining the effectiveness of training future specialists for entrepreneurship through innovative technologies, the strategies for training future specialists for entrepreneurship in European practice are evaluated with a view to their implementation in higher education institutions of Ukraine. A comparison of the input and results after the practical implementation of European educational practices in the educational process is carried out, and statistical calculations confirm their effectiveness. It is determined that implementing the outlined innovative technologies for training future specialists for entrepreneurship will allow Ukraine to develop highly qualified specialists who are ready for global entrepreneurial challenges.

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## Appendix 1

### *Survey to Determine the Effectiveness of Training Future Professionals for Entrepreneurship through the Use of Innovative Technologies*

Evaluate the effectiveness of adaptation to the educational system and further implementation of each innovative technology using four criteria. Each question is scored from 0 to 12 points. Notes: 0 is the lowest score, 12 is the highest score.

#### **Criterion 1: Compliance with modern labour market requirements**

Evaluate the level of use of disciplines and modules in the curriculum that focus on working with innovative technologies.

0	1	2	3	4	5	6	7	8	9	10	11	12
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Evaluate the frequency of participation of teachers and students in international internships and experience exchange programmes.

0	1	2	3	4	5	6	7	8	9	10	11	12
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Estimate the proportion of graduates who apply their entrepreneurial knowledge in practice (business or start-ups).

0	1	2	3	4	5	6	7	8	9	10	11	12
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#### **Criterion 2: Application of digital and innovative technologies in the educational process.**

0	1	2	3	4	5	6	7	8	9	10	11	12
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Assess the level of integration of online platforms for entrepreneurship education into the educational process.

0	1	2	3	4	5	6	7	8	9	10	11	12
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Using digital tools, evaluate the frequency and quality of business simulation games and case studies.

0	1	2	3	4	5	6	7	8	9	10	11	12
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Assess the level of digital monitoring of student performance based on the chosen technology.

0	1	2	3	4	5	6	7	8	9	10	11	12
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#### **Criterion 3. Application of public-private partnerships for the development of entrepreneurial competence.**

Estimate the proportion of educational initiatives that can be implemented with business institutions.

0	1	2	3	4	5	6	7	8	9	10	11	12
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Evaluate the level of involvement of business representatives as experts and mentors to evaluate student projects.

0	1	2	3	4	5	6	7	8	9	10	11	12
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Evaluate the possibility of conducting entrepreneurial student internships and internships in the context of enterprises.

0	1	2	3	4	5	6	7	8	9	10	11	12
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#### **Criterion 4. Development of practical readiness for entrepreneurship**

Assess the level of skills of higher education students in financial strategic planning

0	1	2	3	4	5	6	7	8	9	10	11	12
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Assess the ability of higher education students to assess market prospects and challenges

0	1	2	3	4	5	6	7	8	9	10	11	12
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Assess the level of independence of higher education students in project development.

0	1	2	3	4	5	6	7	8	9	10	11	12
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