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# TRAINING OF PERSONNEL FOR INDUSTRY 5.0 THROUGH UNIVERSITY CLUBS FOLLOWING THE EXAMPLE OF THE UNIVERSITY OF RUSE

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**Abstract.** Industry 5.0 requires an innovative approach in every area of life, requiring us to think about protecting the environment, creating quality of life and increasing efficiency in industry. Despite the conflicting feelings it arouses in the discussions about the new place of man in the labor market, all experts agree that a qualitatively new approach is needed in the training of personnel who can quickly adapt to emerging changes. The presented research discusses the changes that occur as a result of Industry 5.0 and provides guidance for the training of personnel in higher education institutions through the creation of university clubs, where a direct connection between students, employers and teachers/researchers is made. As a result, a synergistic effect should be obtained from the accumulation of knowledge, skills and competences, which will increase the employability of young people, encourage the development of scientific products dictated by the needs of the industry and increase the competitiveness of partner companies.

*Keywords:* Industry 5.0; higher education; university clubs; university-business cooperation; university-industry cooperation

## 1. Introduction

Young people face a number of challenges in their professional development – choosing an appropriate education, the need to develop knowledge and skills throughout life and quickly adapt to the new changes imposed by information and communication technologies, as well as the transition to Industry 5.0, in which every employee will be expected to be creative and able to make decisions. Questions arise as to whether artificial intelligence will replace humans and thus lead to unemployment. The structure of jobs and the employed workforce is changing (Albinowski & Lewandowski 2024), and according to Kolade, O., & Owoseni, A. (2022), digital transformation has led to technological unemployment and polarization of jobs Employment 5.0 requires a general change in the education system, investments in retraining and upskilling, and the work of the future will be characterized by autonomous workers who use their creativity.

Higher education is faced with the need to adapt the provided training to the needs that Industry 5.0 imposes, and according to Hashim, M. A. M., Tlemsani, I., Mason-Jones, R., Matthews, R., & Ndrecaj, V. (2024) "integrating the elements of Industry 5.0 (planet 5.0, society 5.0, economy 5.0) into higher education practices will enable higher education institutions and their stakeholders to achieve sustainable beneficial outcomes for society, planet and economic sustainability". According to Minchev, N., Hristova, V., & Stoyanov, I. (2023), digitization is a serious challenge for the educational system, due to its conservativeness, and the complexity and dynamism of the environment hinder the creation of "sustainable educational models with which to set the basic scientific foundations, the study of which enables the acquisition of key knowledge and skills, and the development of competences".

The question arises as to whether graduates are ready to meet the needs of business for professionals with an impeccable command of the latest technologies, combined with enough soft skills to ensure quick adaptation to the workplace, low costs of introduction training for employers and sustainability of employment in the time.

The purpose of this article is to present a concept of university clubs, through which higher education institutions can adapt the training to the needs of Industry 5.0 and thus provide businesses with competitive personnel. To achieve the thus formulated goal, the following tasks were completed: (1) the main characteristics of Industry 5.0 were clarified; (2) some challenges that Industry 5.0 poses to higher education are formulated; (3) a concept for training personnel for Industry 5.0 through university clubs based on the example of Ruse University is presented. Different research methods and approaches were used, including the methods of analysis and synthesis, systematic, complex and interdisciplinary approaches were applied. As a result of the research, a practical solution for launching a university club together with business partners has been proposed, which leads to an increase in the employability of students, promotes the introduction of scientific innovations in enterprises and stimulates joint research activities in higher education.

## 2. Characteristics of Industry 5.0

According to James Jardine, GxP Lifeline Editor, MasterControl (2020), the term Industry 5.0 refers to humans working alongside robots and intelligent machines. It's about robots that help people work better and faster by using advanced technologies like the Internet of Things (IoT) and big data. It adds a personal human touch to the automation and efficiency of Industry 4.0. In the past, in manufacturing environments, robots performed dangerous, monotonous, or physically demanding work, such as welding and painting in automotive plants and loading and unloading heavy materials in warehouses. As machines in the workplace become smarter and more connected, Industry 5.0 aims to merge these cognitive computing capabilities with human intelligence and ingenuity in collaborative operations.

Vural Yuzdemir (2018) claims that the term "Industry 4.0" was coined and popularized by Henning Kagermann and colleagues as part of the German federal government's high-tech strategy and in response to the digitization of production in the previous decade. Historically, Germany has had deep roots in manufacturing. Not surprisingly, the first proponents of high technology were from Germany. Industry 4.0 practices are spreading in various scientific and technological fields, including healthcare. The physical and virtual worlds are now interconnected. Together, the Internet of Things and cyber-physical systems lay the foundation for Industry 4.0. One can produce a real-time digital copy of all objects, animate and inanimate, in a given space and time, whether in a factory, hospital, building, smart city, or in retail and customer service. The possibilities of billions of people connected to mobile devices with unprecedented processing power, storage capacity and access to knowledge are limitless. And these opportunities will be multiplied by emerging technological breakthroughs in areas such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy, and quantum computing.

Pedro Coelho's (2023) proposes a set of concepts that share similar characteristics: A revolution to promote a more just and sustainable society in which there is a symbiotic/cooperative relationship between man and machine/robot. Like Industry 4.0 and the emergence of government programs, Society 5.0 by the Japanese government and following the debates surrounding the future of industry in the EU, the spread and introduction of the term in contemporary literature can be explained. However, some of these concepts partially overlap with the current research developments carried out on Industry 4.0, namely the Operator 4.0 framework. On the other hand, the disruptive nature of the I ndustry 5.0 is yet to be established. Its main features are seen more as a value system than as innovative technologies. This does not mean that future scientific developments could not help to define an innovative/strong idea that binds the identified values and technological solutions to characterize Industry 5.0, as a real industrial revolution with a significant economic and social impact.

Xu, Vogel -Heuser and Wang (2021) argues that Industry 5.0 centers around the following interrelated core values: human-centeredness and sustainability. A human-centered approach places basic human needs and interests at the heart of the production process, moving away from technology-driven progress and fully focusing on people and society. As a result, workers in the industry will be seen not as an expense but as an investment. Technology is created to serve people and society, which means that, in production, the latter is adapted to the needs and diversity of the workforce. A safe and inclusive work environment must be created with the health and general well-being of the worker as top priorities, as well as autonomy, human dignity and privacy. Industrial workers must continue to upskill and retrain for better career opportunities and work-life balance. With respect for

planet Earth, we must move towards a fully sustainable-based industry. Sustainable development in industrial production must guarantee security in times of crisis. The future industry must be resilient enough to deal quickly and effectively with geopolitical changes and natural disasters.

**3. Challenges that Industry 5.0 poses to higher education**

The labor market is a dynamic, with workforce behavior changing across generations. Deloitte (2021) analyzed the behavior of Generation Z and concluded that young people today have very different behavior in the labor market than previous generations, for whom financial stability and job security are particularly important. Work-life balance, flexible working hours, bonuses and benefits are also important to them. Employers are already facing the challenges of adapting jobs to the constraints of the labor market.

Higher education institutions are faced with the challenge of preparing staff who are adequate to the new realities and meet the requirements of employers in an environment that is changing so dynamically that during their studies they are preparing for professions that do not yet exist Rusev , R, D. Yordanova (2021) . In the foreground comes the need to develop soft skills, through which personnel can quickly adapt to the work environment and the corporate culture of the organization. On the other hand, young people are looking for their fulfillment in working conditions that satisfy them, associated with high requirements for additional social benefits and flexible working hours, allowing a combination of work and personal life. Employers are faced with the challenge of looking for means of additional motivation to attract and retain employees, and according to Minkov (Minkov, Mihailova 2021) purposeful management, company culture is the "tool" through which managers manage to create conditions for self-realization of employees and thereby contributing to the achievement of the objectives of the business organization. Pencheva (2021) emphasizes the problem of "lack of commitment to the company's goals" among personnel in industrial enterprises.

An important aspect of the promotion of the future realization of the students is also their stimulation towards entrepreneurial activity. For this purpose, academic spin-off companies are created, which are perceived as "part of the research process and play an essential role in the transfer of knowledge and the acquisition of a new type of skills" (Vutsova, Varbanova, Netov 2023). In addition, teaching from lecturers who have their own business practice can support adoption of entrepreuneral skills. This is why the encouragelent of academic entrepreneuship is also vital (Sterev 2023).

Some of the main problems related to the successful employment of those graduating from higher education are related to their timely professional orientation, the level of acquired theoretical and practical knowledge and skills, the preference for emigration over staying in the country and the willingness of employers to

invest time and resources in training of young specialists without experience and experience. The career orientation services provided by university must be adapted to contemporary changing environment. This is why there is a need of considering digitalization in provision of career services (Angelova et al. 2023).

University business cooperation can be evaluated as underdeveloped in Bulgarian practice, nevermind that carrer centers are established. They are focused preliminary on carrer orientation and provision of internship and work places for students and graduating. Cooperation practices are fragmented, non coordinated and do not provide hugher effect on future professional realization of graduates. According Galan-Muros, V., and Davey, T. (2019) then are not related to common vision "how universities should collaborate with businesses" and managerial tool is missing. According Mascarenhas, C., Ferreira, J. J., & Marques, C. (2018) "divergent attitudes" between university and business representatives can often be a reason for serious obstacles to fruitful collaboration.

Establishment of a good relationship between higher education institutions and employer organizations in the region with defined vision and clear management structure defined could help to solve the problems defined above. For this purpose, the creation of a new structure – a university club – is proposed.

The concept of creating such a university club is discussed below, using Ruse University "Angel Kanchev" as an example. The vision, goals and tasks of the club are proposed, how to fit into the structure of the higher school, how to implement its management and how to ensure its financing are proposed.

**4. The role of University clubs in the preparation of personnel for Industry 5.0 following the example of Ruse University "Angel Kanchev"**

According to the mission of the University of Rousse "Angel Kanchev", it has as its vocation to disseminate knowledge, to carry out fundamental and applied scientific research and to implement innovations in practice, which ensures the building of highly qualified specialists and sustainable development of the region and the country.

From the mission formulated in this way, a wide range of activities are derived, which are united in the observance of several basic principles: non-discrimination, equal opportunities, sustainable development, protection and respect of individual human rights, partnership, efficiency and effectiveness.

In order to achieve a targeted impact on the various types of resources available to the university, it is necessary to comply with the priorities for work formulated in the mandate program for the management's activities in the period 2024 – 2027. One of them is "Active interaction with the external environment". By combining efforts to work on it and at the same time to achieve "High quality of education and scientific research" – another main priority, the concept of creating new formations called "University Clubs" built together with business partners is reached .

The **vision** for these new structures can be formulated as follows: "University clubs created together with business partners serve to build and maintain a permanent living relationship between the parties participating in them by mediating interaction in various areas of mutual interest."

Logically, goals and objectives of the clubs should be formulated. These main objectives should aim at:

1. Providing high-quality training to students according to the specific requirements of the partner company;
2. Building and maintaining the image of the partner company and Ruse University (RU) by ensuring the successful professional realization of the graduated students;
3. Additional training of employees of the partner company through the Continuing Education Center (CEC) of the RU;
4. Carrying out scientific research work on behalf of the partner company through the Scientific Research Sector (SRS) of RU.

The visualization of the vision and the main goals of the University Clubs are presented in Fig.1

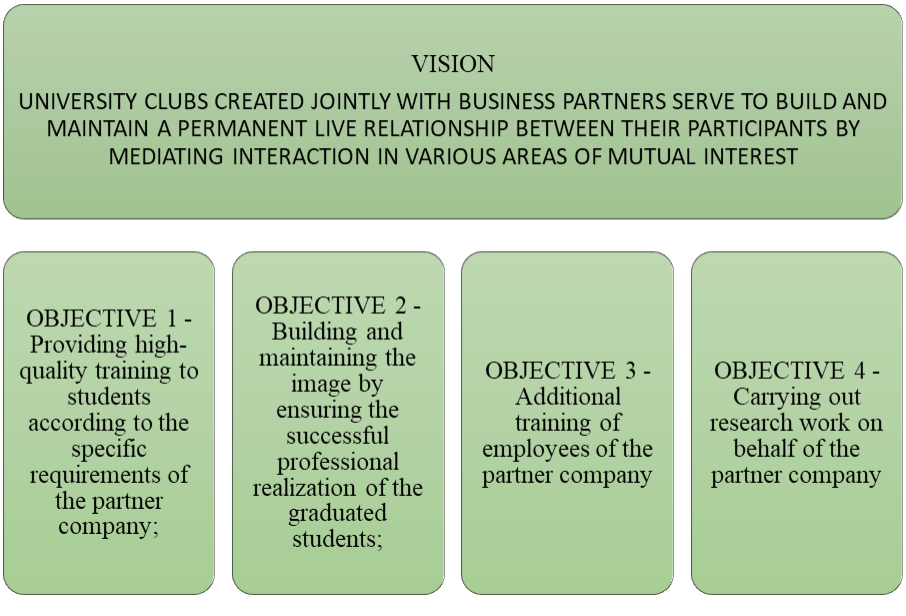


**Figure 1.** Target arrangement of a university club

If the hierarchy of goals and the principle of the work structure of project management tasks are applied, tasks can be separated according to the main goals as follows:

**On the first main objective:**

1.1. Updating training programs and developing new ones, according to the needs of training qualified personnel for the company;

1.2. Disclosure of specialties at the request of the company and branch organizations;

1.3. Inclusion of representatives of the company in the learning process by delivering thematic lectures, seminar exercises and holding external classes in the company;

1.4. Preparation of practical training materials, mock-ups, training setups by and with the help of company representatives, to be used by students in the preparation of case studies, practical tasks for carrying out exercises, tasks for independent training, course and diploma theses;

1.5. Consulting in the performance of the above tasks by the students;

1.6. Financially ensuring the performance of student tasks with products from the partner company;

1.7. Improving the qualifications and practical orientation of teachers through the development of joint research topics, teaching materials and practices in the company.

**According to the second main objective:**

2.1. Permanent support for the professional orientation of students through training for the acquisition of transferable skills and provided information on the labor market;

2.2. Provision of opportunities for conducting practices and internships;

2.3. Funding, including the provision of scholarships for undergraduate and postgraduate students;

2.4. Furnishing of classrooms and laboratories by donating fixed assets and intangible assets to improve the quality of training and the preparation of personnel for work in the company;

2.5. Job offer;

2.6. Establishing contacts between the university and the company‘s business partners to assist the professional orientation and realization of the students. These activities will be carried out jointly with the faculties and CEC;

2.7. Presentations of the company‘s activities to university students.

**Under the third main objective:**

3.1. Analysis of the training needs of the company‘s personnel;

3.2. Development of an individual profile of personnel in the enterprise;

3.3. Preparation of group individual training programs for conducting trainings in the company and at the university depending on the established needs and upon request from the partner;

3.4. Conducting trainings to develop transferable skills;

3.5. Conducting training for specialized knowledge and skills according to the needs of the company;

3.6. Developing strategies for human resource development and lifelong learning;

3.7. Introduction of lifelong learning systems in the enterprise;

3.8. Consulting of managers to improve management processes in the enterprise, including human resources management, management of production processes (service provision), introduction of quality management systems, patent protection and others according to the needs of the company;

3.9. Assistance in introducing a self-learning system.

**According to the fourth main objective:**

4.1. Identification of the needs for the introduction of innovations and assessment of the company's innovative potential;

4.2. Valorization of available innovations and their potential for market realization;

4.3. Joint development of project proposals for access to financing in the direction of development and introduction of innovations in the company;

4.4. Conducting scientific and applied research by scientists from RU at the company's request, including assistance for patenting, licensing and other forms of intellectual property protection and for market realization of innovations;

4.5. Assistance in finding partners with whom to jointly introduce the innovations developed by RU;

4.6. Technology transfer with the assistance of the Technology Transfer Center at the RU;

4.7. Assistance for the internationalization of company activities as a result of newly developed technologies;

4.8. Joint participation in exhibitions, fairs and others to present the joint activity and research output, as well as the result of the cooperation, including financial support for the above;

4.9. Funding by the companies of the promotion of the results of the joint scientific research activity, including their presentation at scientific forums;

4.10. Assistance in the development of project proposals for obtaining financing from the structural and investment funds of the EU, including partnership in the implementation of the project;

4.11. Conducting a joint R&D between RU, the company and students, thereby guaranteeing high quality of scientific production, applicability and high practical orientation of the training conducted in RU, which will achieve high competitiveness of both the partner company and RU and its alumni.

The achievement of these goals should be considered comprehensively, as the management of the process will achieve a synergistic effect by promoting the development of the Ruse region in the direction of intelligent, sustainable and inclusive growth and strengthening its position as well as that of the RU as leaders at the national and international level.

The next question that arises is what should be the **organization and management** of the clubs and how they can fit most effectively into the structure of the RU. We believe that university clubs established together with business partners should bear the name of the partner company and be organizationally included in the structure of the Continuing Education Center (CEC). This makes it possible to use the financial autonomy of the CEC to settle the financial issues between the interested parties participating in the university club, as well as its rights to provide, implement the methodical guidance and carry out training in various fields of knowledge.

In order to establish effective permanent contact between the individual units of the university and the centers and directorates established in it on the one hand, the various units and departments of the partner company on the other, and the students on the third side, it is necessary to have one representative elected for each of them, who willl perform coordinating functions in the relevant organization. For RU, the coordinating person is a representative of a specialized department, responsible for the training of students in specialties, the implementation of which is in the subject of the partner company‘s activity. Annually, a „University Club Activity Plan“ should be prepared and accepted by the members, the implementation of which should be reported every semester and, if necessary, corrections should be made to the plan.

**Regulatory framework and funding**

The rules for creation, membership, functioning, the implementation of all activities, including financial issues, should be regulated in the “Rules for the establishment and functioning of university clubs” adopted by the Academic Council of Ruse University, created together with business partners. As a structural unit of the Continuing Education Center, the university club is subject to all the university‘s internal normative documents, laws and regulations related to them, which regulate its functioning.

Funds from donations of the partner company, the budget of the Continuing Education Center and the Research Sector are used to finance certain activities.

## 5. Conclusion

The professional orientation and realization of those graduating from higher education is an important factor in several aspects. It is an element of assessment when conducting accreditation procedures, it is the basis of young people‘s choice of whether, where and with what specialty to continue their education and, last but not least, it reflects the state of interaction between the interested parties in the region – universities, employers, local government and the workforce. Ensuring a direct link with practice, encouraging the joint development of practical solutions between researchers and practitioners and involving students in learning in a real work environment is a key prerequisite for increasing the employability of young people. University clubs can contribute to the accumulation of practical knowledge and skills, the development of soft skills, the ability to quickly adapt to the labor market, professional orientation and rapid market realization of graduates. It is possible to promote entrepreneurship among

young people and researchers involved in collaboration through university clubs. One of the main problems related to the lack of interest in jobs in certain sectors can also be overcome by encouraging it from the first year of study.

The proposed solution for the organization, management and structure of the clubs guarantees their sustainability over time from an institutional point of view and guarantees financial stability.

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