

DUAL EDUCATION SYSTEM IN A KNOWLEDGE-BASED ECONOMY

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Abstract: The article focuses on the subject of training qualified staff and profiling of vocational training fields. As researchers note, there is currently no doubt that for the effectiveness of the vocational training system to be as high as possible, it is necessary to bring the vocational school closer to the world of work, the labour market and businesses to school. In the 21st century, an employee must be a well-educated expert. In today's economies, where knowledge is a key resource, there is a characteristic pattern. Finding a job is determined 70% by professional knowledge (hard competences) and 30% by soft skills (social competences). However, 70% of work is lost due to a lack of soft skills and 30% due to a lack of professional expertise. Against this background, the author of the article – analysing the dual education system – indicates that coordinating vocational training with the needs of the labour market is an extremely effective method.

Keywords: labour market, education, qualified staff.

Category of the paper: Conceptual paper, Case study.

1. Introduction

The organisational and technical changes taking place, determined by such processes as digitisation and automation, the growing importance of modern technologies and the impact of the environment shaped by the dynamically developing economy based on knowledge, clearly justify the need for constant observation of the situation taking place in the professional and qualification structure of qualified personnel entering the market and present on the markets work, with simultaneous monitoring of their future situation. Particularly significant in relation to these processes is the pursuit of a balance of replacement of qualified staff by graduates of schools preparing future staff at every level of education. This form of cooperation is promoted by a dual education system, which creates a natural method of coordinating the structure of education with the needs of enterprises. The European Commission identifies this system as the best form of vocational training (Dual education system ...). This article is devoted to the

subject indicated above, the main goal of which is to promote a dual education system to increase the chances of obtaining employment by graduates entering the labour market.

The theoretical considerations contained in the article were carried out on the basis of literature analyses in the area of the key cognitive area for the subject, i.e. referring to the dual education system in the perspective of a knowledge-based economy and the increase in the competitiveness of labour resources – and include numerous complementary works. These are, in particular, studies focusing on the labour market, vocational education at all levels of education and qualified staff – as has already been noted earlier – in the perspective of a knowledge-based economy. This article includes publications that are both theoretical and describe research results and forecasts. In addition to these publications, studies were also used regarding the issues of evaluation and development perspectives of the dual education system in the European Union and Poland.

The article also refers to European and national documents in which medium and long-term goals and tasks in the field of education policy and training of qualified staff are outlined.

2. Education in the face of challenges arising from a knowledge-based economy – selected aspects

There can be no doubt that education responding to contemporary challenges is a guarantee of promoting knowledge and profiling mobile and adaptive qualified staff characterised by having a specific level of knowledge, qualitatively unique skills and highly developed qualifications (Kwitok, 2016, pp. 145-155). Such staff constitute the basic resource of labour supply and any organization. Good, qualified staff in the surrounding economic reality can minimise structural stratification in the labour market, eliminate the mismatch of professional qualifications to the needs of employment, limit the increase in unemployment and ultimately decide on economic growth and the success of an enterprise's mission. As is noted in research in the area of the labour market, in particular in the field of organisation and management, in the recent past, a competitive advantage on the market was demonstrated by enterprises with relatively complex capital resources, which were most often technologies, raw materials, labour resources, etc. Currently – as indicated by research in the field of management – dominating on the market are enterprises with appropriately educated, modern, intelligent and sensitive staff, which efficiently and effectively use their potential to achieve the assumed economic goals and accomplish the mission of the company (Marszowski, 2018, pp. 213-240). The dominant in these activities is a modern and innovative education system responding to contemporary and future challenges at every level of education. A system which, in line with short and medium-term economic goals and megatrends (demographic, technological and climate change). It determines the successful development of the most important capital (human and social) in

the modern world and the human attitudes resulting from them, universality of ideas, ability to create them and gather around them the most creative individuals, norms of behavior and, above all, creating a climate for the fulfilment and success of the individual in the modern and changing world with dynamics hitherto unknown (Marszowski, 2018, pp. 5-26). In this context, particular importance should be attached to the literature of E. Rostańska, who notes that education is not a process that can be closed at certain stages, as if it were indicated by structural divisions. It happens in the passage of time and the changes it brings. It also does not happen uniformly. It is in a constant state of mobility, in the changes experienced by its participants. This also applies to the context and impact of external factors that change educational situations and differentiate the social functioning of learners. The components of these changes function as fuzzy sets in the life space of the participant and, consequently, the recipient of education (Rostańska, 2018, p. 12).

In a different perspective, the future is seen through the prism of such determinants as the aforementioned automation, digitisation and related phenomena. It is these determinants in the near future that will most likely lead to a redefinition of work. Currently, digital competence will be a guarantee of professional success. In the area of digital competences, strategic advantages on the labour market will mainly result from the skills of data analysis and related future professions, such as Data Scientist (Data Scientist, 2012), Data Engineer (Data Scientist, 2012) and DevOp Engineer (Damon, 2010). In the process of changes taking place based on the progressive computerisation of societies and economies, it is expected that in the perspective of 2050, nearly half of the current occupations currently on labour markets will disappear due to their replacement by machines. It is forecasted that in the most developed economies, over 50% of all jobs will be automated; for the national economy, it is estimated at 40%.

In the context of the changes described above, it is extremely interesting to anticipate the process of growth and development of the digital society (Understanding European Union, 2014). Finding yourself in this society requires having the right skills in relation to changes caused by the technological revolution. Currently, man, being an element of a network community, is becoming a part of a network connecting people with devices in a complicated communication system. Access to the system is enabled by interfaces, technological solutions that are the link between the human world and machines, and between machines. The interfaces and logic of the system's functioning create affordances (Dant, 2017), outlining the area of the objective independence of the individual in a technical civilization. Progress in the development of interfaces fully correlates with the development of anthropotechnics that determine, in an optimal way, adaptation of positions, processes and the work environment to the psychophysical potential of man in order to protect his life and health and create opportunities for his fullest personal development (PWN...). In another approach, affordances are associated with the human body. The resulting applications can, in this case, perform therapeutic functions, e.g. implants inserted into the brainstem to restore hearing. On this basis, hypotheses are

formulated in which a man increasingly integrated with the technical systems surrounding him takes the form of a cyborg (Batorski, 2012, p. 20).

The phenomenon described above, as indicated by numerous expert opinions, is associated with another process, as a result of which it can be expected that in the near future, two currently binding languages in the world, which are the native language and one selected foreign language, will be joined by another coding language (Hapaniuk, 2013). In this light, it is worth noting that digitisation determines the disappearance and emergence of new professions in the area of the labour market, such as (Matusiak et al., 2009, pp. 123-124):

- traffic manager (a person who tracks website traffic),
- new metrics analyst (dealing with detailed numerical tracking of website movements),
- content manager (dealing with the organisation and methods of presenting web content),
- e-mail channel specialist (a person who develops the company's strategy regarding communication by means of incoming and outgoing e-mail),
- ethical hacker (a person who searches for vulnerabilities in networks and their protection),
- researcher – information manager,
- broker and information selector,
- specialist in classifying and indexing information/content,
- specialist in information flow management
- information reliability auditor,
- specialist in optimising information positioning on search services,
- intellectual property rights broker.

Due to the indicated changes in the digital society, emerging, so-called a class of digital employees whom can work anywhere and create numerous personal and business contacts. In this way, this class determines the process in which digital knowledge becomes the foundation of power of the global economy. In such a shaped world, digital creativity and curiosity prevail, which are the characteristics that mainly characterise young people. The need to exchange knowledge between young people and the older generation is clearly emerging in this process. The indicated relationship aims at the urgent need to reduce the growing intergenerational information gap. It seems that only communities in which this gap will not take place will be able to create new technologies and solutions in a world based on digital knowledge. In this light, due to the scope of the problem of this reflection, special importance is attributed to changes focused on the issue of the importance of the quality of professional staff for the economy. Against this background, serious changes in the near future are clearly changing in the qualification structure of labour resources, which will be determined, among others, by a process of dynamically developing new economic fields. As the authors of the study “Active + future of the labour market 2017” note, in the coming years a digital tsunami will roll through the labour market. Digital technologies – both those that we know and tame today and

those that have yet to be invented – will revolutionise the economy, change the way companies and public institutions function and, above all, will have a huge impact on the nature of work. Even today, experts predict – as has been emphasised several times – that technological changes resulting in the automation and digitisation of many mental and physical activities will contribute to the disappearance of many professions from the labour market (Active + future, 2017). The forecast indicated above clearly determines the need to recognise the staffing needs in the economy in various cross sections and periods. It seems that it is also worth noting, in relation to the demand for qualified staff, their importance for the current implementation of economic goals and the future, associated mainly with attempts to forecast staffing needs and correlating them with the education system. As the authors of the work note, strategic foresight of modern economy staff in the appropriate educational, labour and structural market policy creates an opportunity to build Poland's competitive advantage on the basis of human capital. Offensive inclusion of the state and public structures in a strategic partnership with enterprises, scientific institutions and the social sector provides opportunities to use global economic and social transformations and the current crisis to catch up on structural backlogs. Intervention in this regard is fully justified by the existence of a market failure. In economics, market failures are a situation in which the distribution of goods and services is not effective. This means that there is another imaginable effect where at least one person can be better off without causing the other person's situation to get worse. Market imperfections can be seen as scenarios in which individuals' pursuit of purely self-interest leads to results that are not effective – they can be improved from a social point of view. Therefore, in the field of development of science, education and innovation, we identify the imperfection of the market mechanism, and it is justified to take initiatives to increase market efficiency (Matusiak et al., 2009, p. 163).

In view of the overall reflection on the importance of economic and social conditions in the context of education in the face of the challenges arising from a knowledge-based economy, it can be concluded that the external factors of development, which constitutes technological progress, are probably running out. This resource seems to be contemporary people and their knowledge and skills. People's knowledge and skills are an endogenous development factor that shapes their attitudes and behaviours, and thus influences the activity, creativity, commitment and effects of undertaken actions. Based on the above thesis, there can be no doubt that the promotion of knowledge and the formation of qualified staff that fit into short- and medium-term economic goals and megatrends related to globalisation are dependent on human and social capital – as well as the resulting human attitudes, the universality of ideas, the ability to create and gather around them the most creative individuals, norms of behaviour and, above all, creating a climate for the fulfilment and success of the individual on the contemporary labour market (Marszowski, 2018, pp. 213-240).

3. Contemporary conditions of qualified staff education – status and perspectives

Knowledge is the determining factor for competitive advantages in a globalised world economy (Tusińska, 2014). In earlier periods, this factor was labour, capital and land. The end of the 20th century introduced a new term, previously unknown, i.e. knowledge-based economy. According to the definition of the term, it is assumed that economic development is correlated with the appropriate use of knowledge (Mańkiewicz, 2016, pp. 130-140). This state increasingly determines the disappearance of the impact on the development of economies of factors such as capital and labour resources in the areas of productivity, competitiveness and efficiency for the increase of impact on the above-mentioned areas of knowledge in the field of technical sciences, economics, organisation and management. As indicated in literature, relations shaped in this way make it possible to increase the competitiveness of economies, which additionally determine the following key factors: innovative technologies and products, as well as efficient management. In conclusion, the dynamics of changes taking place in globalised economies is conditioned by the resource and modernity of people's knowledge, quality of work, education and training, the ability to think quickly, innovate and implement new solutions in the processes of production, distribution and services (Kołodko, 2010). In this light – as numerous studies and documents indicating the strategic directions of development of national, regional and global economies indicate – investments in science and education are of particular importance (Soszyńska, 2008, pp. 134-165). As practice confirms, such investments are the most profitable form of supporting the modernity and competitiveness of economies as a result of economic growth.

In this light, it is worth noting that today, special importance is attached to human resource management. All the more if management means, in general, the ability to work through other people. In practical terms, the skill indicated is difficult and complex. Effective human resource management requires, apart from substantive knowledge, one to be aware of their needs and to have a system of values. It is only on the basis of knowledge shaped in such a way that it is possible to take up challenges related to the development of a system of motivation, assessment, promotion, etc. By generalising the definition of human resource management, it can be stated that it is the ability to set the principles and methods conditioning the pursuit of an organisation's goals through the employees employed in it, i.e. qualified staff who meet the specific needs (Sajkiewicz, 2004, p. 33). As Dudzińska-Głaz notes, the goal of strategic human resource management is to strive for a state in which everything (i.e. tradition, work style and organisational structures, as well as the quality, commitment and motivation of employees) brings the company closer to the desired success (Dudzińska-Głaz, 2012, pp. 83-84). In this context, strategic thinking is an essential, and perhaps even the most important,

component of human resource management. He outlines the framework within which specific solutions to problems arising in a team are developed and adopted.

Based on the above regularities, it should be stated that human resources – including qualified staff – together with their knowledge, skills and qualifications, constitute the basic resource of labour supply and of each organisation. Good, qualified staff in the surrounding economic reality can minimise structural stratification in the labour market, eliminate the mismatch of professional qualifications to the needs of employment, limit the increase in unemployment and ultimately decide on the market success of an enterprise. While only a few years ago, enterprises with relatively simple resources (technology, raw materials, means of labour and even capital) had the greatest advantage, nowadays, when everyone can have such resources, enterprises employing qualified and efficient staff who are able to manage it gain a competitive advantage and use its potential. A competitive advantage in current farming conditions is achieved by employing the right people and managing them properly. In response to the above thesis, it is worth noting that staffing needs are determined by two spheres, which are labour demand and labour supply. It seems that today it is much easier to predict the supply stream in both quantitative and qualitative systems. It is much more difficult to recognise the shaping of the demand side of the labour market. This is very important due to the fact that the demand for work is one of the most important factors determining the development of the economy and income and, as a consequence, also the quality of life of the inhabitants of a given country. It is important to anticipate trends in the shaping of the labour market in order to match its supply and demand side (Batóg et al., 2015). However, restrictions are observed here. As compared to labour supply, labour demand is much more often subject to strong changes, and its characteristic features are high diversity in terms of sectoral, spatial, professional structure and desired qualifications of employees (Skills Supply..., 2010, p. 33).

As indicated by the author's research, the practical absence of appropriately qualified staff in economies results in their lack of development (Local labour markets..., 2019, pp. 36-40). This is usually the result of an increasing qualitative stratification between skills possessed by labour resources and needs reported by the economy. It intensifies the indicated stratification, in which the vocational education system does not prepare qualified staff appropriate to the needs of the labour market in sectors and industries that are dynamically developing and have the ability to increase employment. Changes taking place in the modern world pose ever new challenges for the education system and enterprises, which in turn are reflected in their interior, leading to changes in processes and structures. Both education systems and enterprises that intend to survive and develop must skilfully forecast the surrounding reality and permanently adapt to changes, including through proper strategies and permanent shaping of processes occurring inside them. In addition to this challenge, new problems are currently emerging in the field of human resource management as a consequence of changes in the global economy, to which domestic enterprises are participants. One of such challenges is the constant need to adapt education to processes taking place on the labour market, which often diverge from the

directions of economic development and the needs of the enterprise. That is why skilful recognition of staffing needs expected in an economy is so important (Strategy for Responsible..., 2017, p. 264). In this light, qualified staff will create the most valuable resource, shaping the economic future of a national economy (Program for the hard coal..., 2017, p. 72). The above thesis is confirmed by the results of research by Bartlett and Ghoshal, who state that in today's highly competitive world, driven by new technologies, the unique potential that is a key barrier to the development and achievement of strategic goals of companies and organisations is not having a specialised knowledge and experience responding to the changing surroundings, as well as potential in the area of organisation and management, which creates the basis for their use in achieving the goals and mission of an enterprise (Program for Silesia..., 2017, p. 29).

4. Dual system of vocational education in a knowledge-based economy – theoretical aspect

The term dual education system is widely used in EU countries and refers to vocational training, which is dominated by dualism, defined as the duality of the learning place, e.g. school, the place where vocational training is organised, and enterprises that are jointly responsible for conducting theoretical and practical training, as well as the duality of institutions that are responsible for education policy in the field of vocational education and training (public and private institutions). The dualism of the place where vocational training is organised is the basis of definitions found in international literature. According to the UNESCO definition of the UNESCO agenda, a dual education system occurs when vocational education and apprenticeship are combined as part of school activities. In a different approach, the dual education system occurs jointly during the period of study at an educational institution and in the place of professional practice – the definition of the European Centre for the Development of Vocational Training (French: Center Européen pour le Développement de la Formation Professionnelle, Cedefop) (Vocational education and training..., 2011). According to the European Centre, a dual education system can be defined alternately as apprenticeships or work based learning. The source shaping the alternate definition of the dual education system is the recognition by both scientists and decision-makers of apprenticeships as a key factor improving the difficult situation of young people on the labour market (Youth unemployment..., 2018, pp. 12-24). Therefore, great importance is attached to the development of apprenticeships and, more generally, apprenticeships in the workplace. Despite the fact that, in all EU countries, the vocational training of an apprenticeship in the workplace is implemented in the education system, its scope, popularity, accessibility and its effects are very diverse. The reason for this is the lack of a homogeneous and universal dual vocational training model for all EU countries,

even though most Member States choose a model that dominates the systematic combination of learning through practice at work and at school. This condition is determined by several factors, among which the most important are the differences in educational law and the variety of social and economic conditions. Therefore, it is noted that it is not realistic in the short term to reach a state where an identical dual education system model would exist in the EU.

In light of the abovementioned regularities, there is no doubt that in order for the effectiveness of the vocational education system to be as high as possible, it is necessary to bring the vocational school closer to the world of work, enterprise, labour market, the needs of the economy, and companies to school. The potential employee gains knowledge that is complementary to each other at school and in the company, which must be brought closer. In many European countries, this rapprochement has been taking place for a long time. To bring schools and enterprises closer together, both social partners should be interested in and involved in the process, and three conditions in particular must be met (Marszowski, 2011):

- opening education to the world of work. Adjusting the assumptions of education to the needs of the world of work, knowledge of enterprises and the perception of changes determining the activity of production are elements that the school must take into account. Enterprises in Germany, Austria and Switzerland cover a significant proportion (from $\frac{1}{4}$ to $\frac{1}{2}$) of the costs of dual vocational training for young people;
- entry of the enterprise into the education process, not only towards its employees, but also young and external adults. providing qualified employees to the enterprises. The company itself is responsible for this. Some companies make a significant effort to train their staff in line with technological innovation. Others do not and throw workers who could undergo further education into the street. Enterprises in Germany, Austria, France and the United Kingdom contribute 50% of the cost of continuing adult education. In France, large companies (over 2,000 employees) spend more than 5% of their salary costs on training; small enterprises (less than 20 employees) allocate 1.2% of remuneration;
- development of cooperation between educational institutions and enterprises. Strengthening the relationship between education and an enterprise is preceded by the development of an internship system. Thanks to practice, young people can simultaneously acquire the skills and experience needed to operate in an enterprise. This is a big advantage when these people enter the labour market. The promotion of science at a European level will be an additional value for both young people and enterprises. The rapprochement between education and production must also allow for the encouragement and renewal of vocational, basic and lifelong learning.

5. Dual system – the best way of vocational training

The dual education system creates a natural method of coordinating the education structure with the needs of enterprises. The European Commission identifies this system as the best way of vocational training (Lechman, 2018, pp. 213-240). Education in the dual system takes place in a vocational school and in enterprises. The education process lasts up to four years in professions and specialties requiring formal education. Training at workplaces in enterprises, based on national programmes, is conducted by masters and specially prepared instructors. Enterprise training supplements vocational school education and includes elements of general and theoretical knowledge, as well as elements of knowledge related to profession or work. The legal (formal) basis for an internship (apprenticeship) in an enterprise is a contract (employment contract) between the employer and the apprentice. The amount of remuneration is set out in the collective labour agreement. The combination of practical vocational training and general education is of great positive importance in integrating young people into working life and facilitates the transition from the world of science to the world of work (employment). The company is not obliged to employ trainees after the final exams, but in many cases, companies decide to employ apprentices. In Germany, 70% of German school graduates find employment in enterprises where they completed internships, and about 55% of students of the dual education system after five years still worked in the professions they gained in this system. Many young people easily find work in other professions in which they formally do not have diplomas, which proves that the system is not overly rigid (due to narrow specialisations).

The implementation and functioning of the dual system are determined by both a long tradition and the commitment and motives of the partners of the educational process. In several of the most developed countries, the dual vocational training system is used extensively, although public authorities, entrepreneurs and students have complete freedom to choose education systems. The costs of education in this system are high, but they are spread over public authorities, entrepreneurs and students (but not parents). Education in the dual system is based on a tripartite financing formula. This means that three partners participated in the costs (investments) of education: public authorities, employers and students. The dual education system can therefore be treated as a new model of investment in man. In Switzerland, public authorities cover about half of the costs of education and are therefore interested in it; students almost 1/3, and employers 1/4. Students participate in the costs of education with their work, for which they also receive remuneration. In Germany, there is a higher share of employers in education costs than in Switzerland, and this is at a level of 50%. Such an education system is a form of investment in man, which is implemented by the joint effort and joint concern of social partners. In other vocational education systems, the majority of expenditures is borne by public authorities, as well as part by parents and students. In countries where the dual education

system prevails, employers incur significant education costs, which is why they are interested in making this system as effective as possible.

The cost of dual education in a company includes:

- intern's salary,
- the time spent by the master or instructor on the intern,
- administrative costs,
- costs of using machinery and equipment for training purposes.

The income of the enterprise employing trainees includes subsidies from public authorities and employers' organisations, as well as the trainees' contribution to production. Therefore, it is necessary to distinguish between gross and net costs. The gross cost includes all costs incurred by the enterprise, while the net cost is the gross cost minus the company's income obtained from the employment of trainees. In some companies employing trainees, the contribution of apprentices to production exceeds the costs incurred by the company. This means that the company not only does not incur additional expenses, but benefits from this. This applies to small enterprises employing between 2 and 9 employees. This thesis is confirmed by research carried out in Austria. They showed that small enterprises, employing up to 2 trainees, employed a total of over 31 thousand trainees. This represents a percentage of 69% of total employment (Kabaj, 2012).

The employment structure of trainees according to the size of enterprises refutes the widely held thesis that only large enterprises can organise internships that meet all the conditions – organisational, technical and others. The analysis of costs and efficiency of the dual system cannot be limited to the direct (net) costs of enterprises. Indirect effects can also be extremely important. The significantly lower unemployment rate of vocational school graduates in the dual system is just such a positive indirect effect. Another indirect effect of the dual system is that it makes it possible to share the costs of education between public authorities, the enterprise and educated persons (student work input), which significantly increases investment in vocational education. The third indirect effect of dual education is that young people covered by this education system receive remuneration, which relieves public authorities (scholarships) and parents of part of the costs of living and education.

Research in Austria, Germany and Switzerland suggests that the main reasons for the interest of enterprises in the dual system of training and employment of trainees are (Sztanderska, Drogosz-Zabłocka, 2013):

- securing highly qualified staff,
- better selection of candidates due to several years of observation,
- reducing the costs of recruitment and fluctuation of staff.

The percentage of students receiving tuition in the dual system is the highest in five countries; namely, among primary school graduates in Switzerland, 60% choose dual

vocational training, in Germany – 53%, in the Czech Republic – 49%, in Austria – 36%, and in Hungary 27%. There are two important reasons for this:

- the dual education system guarantees obtaining solid practical and general education, which creates a chance for finding a job quickly and surely – in three cases out of four in the enterprise where the internship took place,
- seniority has the form of an employment relationship for which a salary is received, the amount of which is increased from year to year as education progresses.

Apprentices' wages increase as they acquire theoretical knowledge at school and practical knowledge in the enterprise. This increases its efficiency and enables to undertake tasks requiring higher qualifications. Swiss research shows that apprenticeship performance is a function of qualifications that increase as the internship period expires. In the first year, the trainee's performance reaches 19%-21% of the qualified employee's performance; in the third and fourth years, it reaches 42%-51%. This is because trainees still spend 35%-40% of their time on theoretical learning at school and practical learning in the company, with the remaining time only for productive work in the company, in services or in the office (Kabaj, 2012).

6. Strengths and weaknesses of the dual vocational education system

Along with the increase of public and private expenditure on vocational training, the most important challenge is to improve its effectiveness, i.e. effectiveness in achieving its goals (Dual education..., 2014, pp. 1-202).

Vocational training aims to enrich the theoretical (technical and professional) knowledge of the student and prepare them for the most effective exercise of a given profession or group of occupations. Education is often measured by the time, during which, a graduate gets employed after entering the labour market. This relationship is correlated with the number of graduates entering the labour market. It is expressed in a simple relationship. The greater the number of graduates who gain employment after entering the labour market, the greater the effectiveness of education. The effectiveness of education also depends on adapting the structure and content of education to the demand for work, in particular to the changing employment needs of enterprises. In this context, another relationship is related to the situation on the labour market. If the labour market has a low demand for labour and its supply is high, graduates usually become unemployed regardless of the quality of education (Pujer, 2016, pp. 13-24). Although, as noted in numerous works, a very important source of unemployment among graduates – regardless of the current situation on the labour market – is the maladjustment of education to the needs in employment (Investing in education..., 2017, pp. 149-158). The indicated state is key to vocational education, whose effectiveness can be measured by the rate of unemployment

among young people in relation to the overall unemployment rate. As researchers note, in a majority of European Union countries, in unemployment, the dominant percentage is characterised by the population of young people (up to 25 years of age) (Youth unemployment..., 2017, pp. 1-5). Looking for the reasons for this phenomenon, it is noted that there are two important factors. The first regularity is that graduates enter the labour market for the first time when older people on the labour market change jobs most often. The second is the low dynamics of changes in the vocational education system in the face of dynamically changing labour demand. The answer to the sources indicated above determining high unemployment among young people is, among others, the dual education system (Łada, 2017, pp. 18-26).

As indicated by numerous studies, one of the key factors strengthening the position of a person entering or returning to the labour market is professional experience. His lack of experience is a significant barrier in finding a job and results in unemployment many times (Economic activity..., 2019). This regularity especially applies to young people up to 25 years old. Statistical data of the European Union and the Member States clearly confirms that a dual education system – based mainly on practical vocational training programmes – significantly strengthens the position of young people on the labour market, contributes to their employment and reduces the unemployment rate in this population (Godlewska-Szyrkowa, 2014).

In this connection, it is worth noting that the European Commission addressed an appeal to Member States to take actions aimed at developing and strengthening vocational education and training in order to improve the quality and professional skills of young people (A new approach to education..., 2012). The European Parliament also took a position on promoting and improving the dual education system, which indicated, through the Culture and Education Committee (CULT) in one report, the strengths and weaknesses of the dual education system. To determine them, research was conducted among 28 EU countries, focusing on changes related to strengthening the dual education system. The research was part of the education and training context as a determinant of comprehensive human development and its full participation in social life, in particular in the scope of shaping young people's skills and attitudes, preparing them to enter the labour market and smooth transition from education to employment. The following key questions were asked in the study:

- how can EU governments ensure their young citizens an effective transition from education to employment?
- where are the main barriers to this transition?
- what actions can eliminate these barriers most effectively?
- how to increase the effectiveness of these activities?

In turn, research goals were focused on the following problem areas:

- key barriers to the implementation of a dual education system in some Member States,
- the reasons why some Member States decide to implement (or not implement) dual education systems,
- determinants shaping the relationship between the quality of vocational education and training, dual education system and economic development,
- trends and changes in the dual education system,
- innovations in supporting and increasing the attractiveness of dual education.

In conclusion, the main purpose of the research described above was for CULT to provide the European Parliament with information on the situation in the field of vocational education and training in the EU in order to stimulate ongoing and future parliamentary debates.

The above report details four key models of vocational education and training. As part of the description, their strengths and challenges were identified. The authors of the report presented a set of recommendations for each model. The first of the proposed models is a fully developed apprenticeship system. Its characteristic features are:

- apprenticeships are an important element of the formal education model. After its completion, the student obtains a State certificate. Certificate obtained and qualifications often make it possible to obtain the status of a qualified employee,
- the subject of professional practice in a given enterprise is determined in the form of a tripartite agreement between the government and the representation of employers' organisations and trade unions,
- students have a precisely defined status and receive remuneration for work performed during the internship, and all parties bound by agreement (students, company, training centre, etc.) have precisely defined rights and obligations,
- the costs of training are borne proportionally by the parties to the agreement – the government covers part of the practice related to school education, while employers finance the training carried out in the company.

This type of vocational education and training model is implemented mainly in Austria, Germany and Denmark. Its key strengths are:

- it guarantees a large number of students and companies the benefits of learning through work placement,
- this apprenticeship model determines the student's smooth transition from study to employment and determines the high level of employment rates,
- as experience has shown, this model is attractive to young people, parents and businesses and is well known to them,
- there is a high correlation between the demand for qualified staff reported by enterprises and the professions trained, which results in their high adaptation to the needs of the labour market,

- the model has a long tradition. This means that the mechanisms developed ensure high efficiency and quality of the solutions used.

However, the model of the fully developed apprenticeship system discussed above results in the need to prepare for the following significant challenges:

- the model is heavily dependent on the supply of apprenticeships provided by the business sector. During periods of economic downturn, there may be a clear decrease in the number of places offered for apprenticeships, while demand remains unchanged. In this particular situation, a competitive apprenticeship market is created. This condition forces the need to provide young people with an alternative form of vocational training,
- this system requires proper recognition of apprenticeships. Students must be equipped with knowledge that enables them to find an employer willing to offer them apprenticeships that require specific skills. At the same time, students must convince the employer that they are characterised by the skill of appropriate behaviour and attitude required in the workplace,
- the system creates a situation in which young people in the most disadvantaged positions have the least chance of finding an entrepreneur willing to accept them for apprenticeship,
- in this model, enterprises should be able to equip students with a wide range of skills to prepare them for full qualifications. This is equivalent to the fact that enterprises must have the necessary technical and human resources to achieve this goal. It can pose a serious challenge and become a barrier in the development of a full apprenticeship model and determines the need to look for a solution involving cooperation between several partner companies.

Another model described in the report is apprenticeship noticed as a complementary form of vocational education compared to other forms of vocational education and training. This model is most common in countries such as France, the Netherlands, Italy, Poland and the United Kingdom. In these countries, apprenticeship systems are not the main form of vocational education and training. In the described model, apprenticeships are often included in vocational education and training programmes implemented in schools. This type of model is combined with two scenarios for its implementation in practice. In the first scenario, apprenticeships and vocational education and training in schools lead to the same qualifications; apprenticeships are an alternative but equivalent path compared to other forms of vocational education and training (e.g. in France and the Netherlands). In the second scenario, apprenticeships result in a special apprenticeship certificate, which is of a different type to that received at VET schools (e.g. Italy, Poland, United Kingdom). In countries that implement the second type of apprenticeship model, there are several common features with the model of the fully developed apprenticeship system, e.g. student status, contract, salary. It is worth noting, however, that this model is popular with

students and companies from the fully developed apprenticeship model. For the second model, the following strengths are noted:

- adapting the supply of apprenticeships to student demand is simpler because of the forms of education provided in schools,
- existing forms of vocational education enable a smooth transition from vocational education and training in schools to apprenticeships in an enterprise, which allows students to change the direction of education during education,
- apprenticeships for the second type of profession can be directed to a specific branch of the national economy, which has the greatest potential for development opportunities related to apprenticeships.

In contrast, the key challenges facing countries implementing the second type of apprenticeship model are centred around the following problem areas:

- by what actions is it possible to extend the scale of apprenticeships,
- by what methods can the positive reception of apprenticeships among students and parents be strengthened,
- how to reduce the tendency to focus apprenticeship systems on traditional sectors (crafts, production) with a staff shortage that may exist in other economic sectors in a given country.

The third model is learning the profession as part of workplace practice, which is part of the programme implemented at a given school. This apprenticeship model is widespread in Finland, France and the Netherlands, in which school education is a key form of vocational education and training, which incorporates elements of practical vocational training in the workplace – which is compulsory and takes longer. In this model, its strengths include:

- involvement in this model of employers undertaking the organisation of practical vocational training for the first time. This model is characterized by no need for the employer to create a paid job,
- the key premise determining commitment is the lack of a commitment on the part of the employer to create a paid job, which is a commitment in the full apprenticeship model,
- gradual introduction of elements of practical vocational training at the workplace is a positive solution, because people who lack the conviction to fully train them are introduced in stages to the future work environment,
- the third model of learning by doing is more flexible than the previous two. It is characterised by a broader offer of internships, which you should address to a more diverse student due to socio-demographic characteristics,
- apprenticeship learning creates opportunities for its implementation in many enterprises diversified due to the nature of economic activity. As a result, the student gains broader experience and more extensive skills. This, in turn, strengthens his strengths and opportunities in the labour market.

Similarly to the two previously described models, the learning of the profession through practice is characterised by weaknesses. They include:

- the need for schools to build a base of enterprises that are willing to organise and conduct apprenticeships in their immediate vicinity. This is a difficult and risky venture,
- the quality of apprenticeship learning and its correlation with school education. This is associated with short periods of apprenticeships and the need to adapt them to the organisational capabilities of the enterprises in which it is conducted. As a result, professional practice takes place in conditions that are not always properly conducive to effective learning,
- employment prospects after the end of the apprenticeship. This is due to the fact that, unlike the two models already described, in the case of apprenticeships, there is clearly less chance that the company will be willing to employ apprentices.

And the last of the described models focuses on vocational education and training exclusively conducted in schools. This is the most common model, which is characterised by numerous regularities, among which the most recognisable include:

- lack of any cooperation between schools and enterprises,
- entrepreneurs' lack of understanding of the goals and the idea of apprenticeship,
- lack of knowledge among employers about the benefits of apprenticeships for young people,
- in the described model, there are also specific problem areas related directly to the school, including: the current curriculum, school equipment and teacher competences.

The final element of the report is recommendations. The following issues are addressed in them. Strategies related to training and shaping and developing skills should be correlated with the needs of the labour market. In this case, knowledge about the specific needs of the labour market is required, thanks to which the trained and developed technical and basic skills contribute to the increase in chances for young people to get employment. It is equally important for employers to promote knowledge about the effectiveness of vocational education and training programmes in virtually every area of the economy and to support the involvement of enterprises that provide young people with the opportunity to acquire a profession through their practical training in the future workplace.

Recommendations corresponding to the four apprenticeship models described above are presented in Table 1.

Table 1.*Recommendations for apprenticeship models in countries using apprenticeships in education*

Systems fully implemented in schools	Systems combining work-based learning and vocational education and training implemented in schools	Apprenticeships as a parallel path	A fully-developed apprenticeship system
Parallel actions: 1) Development of the apprenticeship system as an alternative path in selected sectors. These should be sectors where there are favourable conditions for apprenticeships. 2) Providing incentives to offer training in the enterprise in other vocational education and training implemented in schools. Gradual implementation of the workplace learning requirements.	Gradual increase in the share of learning through work placement. Focus on the quality of work-based learning and how it is linked to school learning. Encouraging schools to develop long-term cooperation networks with local enterprises.	Expand the scale of apprenticeships and gain the interest of new employers. Extending apprenticeships to various sectors and levels. Focus also on non-traditional growth sectors. Ensure recognition of qualifications at a national level.	Supporting diversity in the recruitment process for apprenticeships. Supporting students who are not ready for apprenticeships. Improving the transition to other levels and forms of education and training.

Source: S. Chatzichristou, D. Ulicna, I. Murphy, A. Curth, Dual education system: a solution for hard times? ICF International 2014.

It is worth noting that the development of apprenticeship methods through practice in the future workplace effectively improves and strengthens the position of young people on the labour market and increases the chances of finding employment.

As results from Cedefop reports, in countries using combined education and vocational training, graduates get employment much faster. In countries not using this type of approach in the vocational training system, this time is much longer (Cedefop, 2012).

7. Dual system of vocational education in economically developed countries and Poland

In economically developed countries, we can distinguish four main education systems, which are: dual, dual two-stage, market and state-controlled (public authorities) (Kabaj, 2000, p. 178). Table 2 presents their orderly presentation by country of origin.

Table 2.*Vocational education and training systems in economically developed countries*

System	Countries	Most important features
Dual	Switzerland, Germany, the Czech Republic, Austria, Hungary, the Netherlands and many Latin American countries	Education at school combined with internship in enterprises. Opportunity to undertake training due to closer cooperation between employers' organisations, the State and trade unions.
Dual two-stage	Japan	The first stage of education in vocational and general schools. Stage two internship in enterprises (from one to four years).
Marketplace	USA, Great Britain	State intervention is minimal, as well as the limited impact of the institution on the structure of education.
State-controlled (public institutions)	France, Spain	Broad State intervention in the planning and regulation of vocational training. The structure of education is autonomous, and the education system is not directly related to the demand of the labour market for qualifications.

Source: Available adult education in Europe. Comparative analysis based on national reports published in the Eurobase database. Foundation for the Development of the Education System. Warsaw 2008.

As can be seen, the main criteria that differentiate the above-mentioned vocational education systems are: the role of the market and the State in the regulation of structures and content of vocational education, the role of social partners, mainly employers, in shaping and financing vocational education and the role and place of students in financing vocational education. Equally important in developing plans for the development of education systems is to determine their quantitative and qualitative structure, adequate to the assumed objectives of a horizontal nature and the demand for professional qualifications in the medium and long term. Considering the fact that adapting fields of study to assumed goals related to the demand for work is extremely difficult, it seems that, first of all, one should look for all available methods that can approximate them. One of them is the distribution of the proportion of general and vocational education in the education system, appropriate to the situation on labour markets and with forecasts. In this context, two main types of secondary education are noted. The first is dominated by general education. A good example of this type of education is the Portuguese system, in which the share of general education in the model is 76%. Japan – 72%, Spain – 60% and France – 47% have an equally high percentage of general education in the model. The opposite of these models are systems in which vocational training prevails, e.g. Czech Republic – 84%, Austria – 77%, Germany – 77%, Hungary – 73%, Italy – 72%, Netherlands – 70%, Switzerland – 69% and Belgium – 68%. In economically developed countries, the share of vocational and technical education is 70%, while general education – 30% (Kabaj, LXV/2012). It is worth noting that the choice of a specific education structure should result from forecasts regarding economic development and the demand for work in vocational and qualification terms.

In Poland, changes are currently underway in the area of education law and the act on the education system and other acts. This is associated with a major change in the area of the vocational education system, which aims to strengthen existing measures and introduce new

elements. The direction of changes – which should be particularly emphasised – is in line with the main priorities of EU policy. Its goal is to promote cooperation between employers and schools, especially in the organization of internships (Education and Training Monitor, 2017). This goal is fully correlated with the assumptions of the reform of vocational education, which were determined after 2015 by the Ministry of National Education and are to bring vocational education closer to the needs of the labour market and to expand and increase the availability and effectiveness of vocational education.

In the first stage of the implementation of the vocational education reform, goals have been set, thanks to which a better correlation of vocational education with the labour market should be achieved, along with an increase in its accessibility and efficiency. In turn, the implementation of the adopted assumptions depended on carrying out several large tasks, which were:

- extension of the classification of vocational education occupations and the establishment of qualifications within occupations,
- introduction of an updated core curriculum for vocational education (learning objectives and content described in the form of its effects),
- change in the structure of vocational education by: unifying the education cycle in a basic vocational school to three years, extinction of specialised secondary schools, supplementary technical secondary school graduates and basic vocational schools for adults and technical adult schools (adults will only complete their professional qualifications in course forms),
- achieving a more complete link between vocational and lifelong learning centres,
- making the qualification confirmation system more flexible,
- introduction of schools providing vocational training to the lifelong learning system,
- implementing a new standard of out-of-school education in the form of a qualification course.

In the context of the tasks described, it was equally important to act, as a result of which, on 23 January 2015, an agreement was signed between four ministries: the Ministry of Economy, National Education, Labour and Social Policy and the Treasury, whose goal was to strengthen and improve work conducive to vocational education. Cooperation under the contract is intended to ensure coherent, mutual and complementary action supporting the development of vocational training correlated with the needs of employers, local labour markets and an economy based on knowledge and innovation, as well as promoting and supporting the cooperation of vocational schools with enterprises, including the increase of employers' interest in practical vocational training.

In subsequent stages of the reform of the system of Polish vocational education of the union, the Ministry of National Education undertook numerous activities aimed at developing vocational education in Poland. The most important activities include (Reforms in the field..., 2019):

- Making the structure of education more flexible and providing access to further education by introducing a first- and second-degree industry school. Such a model ensures full patency of vocational education and the opportunity to take the *matura* exam.
- Strengthened practical training by enabling schools to increase the number of hours devoted to its implementation.
- The introduction of compulsory vocational counselling classes at schools in order to increase the accuracy of decisions related to the choice of profession.
- Change in the model of financing vocational education, taking into account the cost of education in individual professions.
- Lifting the limit of remuneration for specialists from the labour market employed in schools.
- Acquiring partners for cooperation for vocational education – the boards of Special Economic Zones declared cooperation with the Ministry of National Education and support for vocational education schools; 12 industry seminars were organised, during which it was discussed how vocational training can respond to the need to prepare staff for specific industries; a joint letter from the Prime Minister and the Minister of Education was sent to employers, including companies of the Treasury, encouraging them to take actions supporting industry and technical education, and the departments responsible for individual professions were included in the cooperation.
- Over 1,000 employers actively participate in the preparation of programme changes (including the creation of modern core curricula that will become effective from 1 September 2019).
- In cooperation with the Central Statistical Office, a new tool is being prepared to monitor the demand for graduates of vocational education schools.
- MEN announced competitions for employers for the best solutions in practical vocational training.
- In response to the appeal of Prime Minister Mateusz Morawiecki and Minister Anna Zalewska, enterprises conclude agreements with schools covering the creation of patronage classes (including Polska Grupa Energetyczna, KGHM).
- Industry representatives conclude agreements with the Ministry of National Education for the development of vocational training (e.g. electricity and energy, rail transport and road transport).

- Any employer interested in establishing cooperation with the school may use the assistance of Coordinators for Vocational Training, specially appointed for this purpose in each school board.
- The Board of Directors of Vocational Schools established at the Ministry of National Education participates in preparing changes in vocational education and in consulting them in the school environment.

In conclusion, the reform of vocational education assumes key changes in the following areas:

- job classification and funding for vocational schools,
- cooperation between schools and employers,
- professional exams.

The overarching goal of the reform – which should be emphasised once again – is to increase the importance of education in vocational education and correlate its educational offer with the needs in employment in order to educate specialists fully adapted to the expectations of the labour market. The above-described dual education model is fully subordinated to this goal.

Summary

On the basis of the dual model of education and professional profiling of qualified staff in the context of a knowledge-based economy, it should be emphasised with full determination that knowledge is the determining factor for competitive advantages. The dynamics of changes taking place in globalised economies is conditioned by the resource and modernity of people's knowledge, quality and safety of work, education and training, the ability to think quickly and innovate and implement new solutions in the processes of production, distribution and services (Parlińska, 2015, pp. 77-83). The dominant in these areas is – as noted earlier – a modern and innovative education system responding to contemporary and future challenges at every level of education.

A system that responds to short and medium term economic goals. Determining the successful development of the two most important human and social capital in the modern world. Shaping human attitudes, the universality of ideas, the ability to create them and gather around them the most creative individuals. Creating a climate for the fulfilment and achievement of successes by the individual in the modern and changing world with dynamics hitherto unknown (Marszowski, 2018, pp. 5-26).

In this context, particular importance should be attached to the literature of E. Rostańska, who notes that education is not a process that can be closed at certain stages, as if it were indicated by structural divisions. It happens in the passage of time and the changes it brings.

It also does not happen uniformly. It is in a constant state of mobility, in the changes experienced by its participants. This also applies to the context and impact of external factors that change educational situations and differentiate the social functioning of learners. The components of these changes function as fuzzy sets in the life space of the participant and, consequently, the recipient of education (Rostańska, 2018, p. 12).

In this light, as indicated by numerous studies and documents setting out strategic directions for the development of national, regional and global economies, investments in science and education are of particular importance (Klimska, 2015, pp. 307-318).

The described state determines, in the education system and enterprises, need for skilful forecasting of the surrounding reality and constant adaptation to changes taking place. Mainly through proper strategies and permanent shaping of processes occurring in their interior. (Marszowski, 2019, pp. 15-23). In light of these conditions, a major challenge is to build qualitative and quantitative education that responds to contemporary challenges in the age of a knowledge-based economy and the Industrial Revolution 4.0 (Götz, Gracel, 2017, pp. 217-235).

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