

## CHAPTER 6

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### SUSTAINABLE DEVELOPMENT AND CHANGES IN THE EDUCATION SYSTEM

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*This paper discusses the changes in the education system that are shifting towards models founded on collaboration between educational institutions and businesses. Moreover, these models are built upon new technologies, digitization, lifelong learning, sustainable development, and innovative educational approaches, with the goal of aligning the education system as much as possible with the demands of the economy. The research findings outlined in the paper demonstrate the level of collaboration between educational institutions and businesses, the pace of investment in human resources for further education and training, perspectives regarding sustainable development, as well as predictions regarding future directions and trends in development.*

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**Keywords:** *Sustainable development, Education, Human resources, Cooperation, Dual education, Environmental protection.*

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### INTRODUCTION

Educational institutions have a great importance and role in the society and economy of a country. The development of the market economy through modern trends shows that education and formation of human resources is the main priority of the national strategy and policy for social, economic and technological progress. Investing in education has an investment character, which must be aligned with the needs of the economy and society. The development of the economy and society is based on

knowledge that is shaped by the educational system (Trifunović et al., 2019).

In order to harmonize the existing education system with education for sustainable development, the knowledge of all relevant sectors must be integrated into it, with a special emphasis on the practical application of what has been learned and ensuring a better quality of life. The key is to create and raise the level of knowledge that can be adapted to the changed structure of the labor market, and to make quality education accessible to everyone, to strengthen early education and develop a system of permanent education for environmental protection while creating educated staff capable of behaving in accordance with the requirements of changes in technology and the economic environment (Radojević et al., 2011).

The Ministry of Education, Science and Technological Development has committed itself to reforms in education with the aim of joining the European Union. Education reform is aimed at modernization of general, professional and higher education, digitization, entrepreneurship, and pedagogical education. The Ministry of Education, Science and Technological Development orients its capacities towards the national priority, the sector of dual education and the sector of digitization in education and science (Grujić, 2021).

This paper will show the changes in the education system that lead to the connection of companies and educational institutions, lifelong education, digitization and include the concept of sustainable development.

In the first part of the paper, the importance of sustainable development and what it includes will be presented, and in the second part, changes in education. New directions that lead to an increasing connection between companies and educational institutions, and include dual education, short study programs, digitization of education will be described. After that, there will be a presentation of the research work and the results that followed the statistical processing of the data, presented through tabular and graphic displays. Three groups of questions are included in the research part. The first group of questions is related to investment in employees for additional education and training, the second group of questions is for cooperation between companies and educational institutions, with an emphasis on those dealing with environmental protection and sustainable development. The third group of questions relates to sustainable development and education for sustainable development. At the end, concluding considerations and development forecasts follow.

## **THE IDEA AND THE CONCEPT OF SUSTAINABLE DEVELOPMENT**

Sustainable development implies the development of a society which, using available resources, meets human needs not endangering natural systems and environment ensuring the long-term existence of human society and its environment, so that it also represents a new strategy and philosophy of social development (Giddings et al., 2002; Mantlana, Maoela, 2019; Žikić et al., 2022). Sustainable development is often related to the protection of the environment, that is, an attempt to connect the survival of life on the planet Earth with the preservation of natural resources and numerous environmental challenges faced by every society, country and humanity as a whole (Blanusa et al., 2022).

Sustainable development, although a widely used phrase and idea, has many different meanings and therefore provokes many different responses. In broad terms, the concept of sustainable development is an attempt to combine growing concerns about a range of environmental issues with socio-economic issues (Mitić et al., 2022). Although sustainability became a watchword in recent years, the idea is by no means new. It has a long tradition in various domains ranging from a basic forestry principle, to economic growth and nature conservation objectives, and the present challenge of sustainable development. The latter does not only involve an extremely important transformation of the ecologically based concept of physical sustainability to the context of social and economic development. It implies the necessity for a holistic approach to integrate some basic principles of sustainability that have been developed in economics as well as in ecology (Hediger, 2006; Nasr et al., 2022).

Contribution to the actuality of this concept is given by environmental dangers that are reflected in environmental challenges and problems, such as: global warming, ozone depletion, greenhouse effect, deforestation, conversion of arable land in deserts, acid rains, extinction of animal and plant species. In order to preserve the planet for the present but also for future generations it is necessary for modern world to be aware of common responsibility and to harmonize development with the needs of people and nature. Sustainable development can create favourable conditions for future generations and can preserve natural wealth of the planet (Otterstad, 2008; Tacon et al., 2022).

*Figure 1: Common three-ring sector view of sustainable development*



*Source: Giddings et al., 2002*

The development of market economy is the reason that the attitudes and behavior of economic entities are more and more based on the assumption that natural resources are unlimited and that they can be used more intensive and more aggressive without taking into account the necessity of their renewability and environmental protection. As a reflection of the aggressive behaviour of economic entities towards nature in general, in the process of ruthless exploitation of natural resources, it is obvious that the courses of their optimal reproduction and environmental protection in general have been disturbed (Žikić et al., 2020). The concept of sustainable development implies a balanced economic, social and cultural development without damaging environment. It predicts preservation of natural resource wealth, whereby consumption level of renewable resources will not exceed the limits within which natural systems cannot compensate it, while the consumption level of non-renewable sources will not exceed the limit within which they can be replaced by renewable sources (Giddings et al., 2002). Besides, sustainable development implies that pollution emissions do not exceed the capacities of soil, water and air in order to preserve quality according to the standards that are at least sufficient for life and well - being of people, flora and fauna. In this way, it will enable future generations to develop themselves at the same or a higher level. It can be broadly defined as an innovation that has to consider environmental and social issues as well as the needs of future generations (Ketata et al., 2014).

The essence of the concept of sustainable development is a correlation of economy development and the environment taking into account laws of

ecological systems. This concept focuses on rational use of natural resource wealth of a country and accordingly, on the improvement of quality of environment and quality of life. In order to achieve sustainable development it is necessary to establish new social values based on knowledge, creativity and skills of human resources, in a word, to create a high - quality staff with intention to transform today's society into a learning society (Mitić et al., 2022).

### ***Definition of sustainability and of sustainable development***

Cost rationalization has become a key factor in every economic system (Erceg et al., 2019). As underlined by UNWCED, sustainable development refers to the concept of “needs”, but limitations imposed by the state of technology and social organizations on the environment's ability to meet present and future needs are also a central concern. Sustainable development must be treated as an ethical code for human survival and progress (Kalagbor, 2022; Jun, Lin, 2022).

The concept of sustainable development implies harmonization of a number of various sectorial interest and priorities. It reflects the need for desired quality and a realistic pace of social development as well as need to balance different social values. There is no single universally accepted definition of sustainable development. The most frequently quoted definition of sustainable development is from Our Common Future (also known as Brundtland Report) published by World Commission on Environment and Development in 1987: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987).

A comprehensive definition of sustainable development is: sustainable development is an integral economic, technological, social and cultural development, harmonized with the needs of protection and improvement of environment, which enables present and future generations to meet their needs and improve the quality of life. This definition represents norms and patterns of behavior that should be followed in order to meet the needs of survival and well-being of human community. Three basic components: economic, social and environmental, are incorporated into this definition, and the sustainable development is based on them. Basic provisions of the above components were defined in 1993 by Mohan Munasinghe, one of the World Bank leading economists:

- economic sustainability: maximizing income while maintaining or increasing natural capital;

- social sustainability: maintaining stability of social and cultural systems
- environmental sustainability: maintaining elasticity and balance of biological and physical systems (WCED, 1987).

Sustainable development is usually presented as the intersection between environment, society and economy. They are interconnected, with the economy dependent on society and the environment while human existence and society are dependent on, and within the environment (Giddings et al., 2002). Solidarity among generations and among nations is also included in sustainable development. It also includes the balance between the needs of present and future generations, as well as the balance of the needs at local and regional levels together with the needs of the whole planet.

### *Pillars and principles of sustainable development*

Sustainable development means dealing with economic and social development with careful use of limited natural resources and environmental protection. On the other hand, economic development takes a central position because other two elements cannot develop without it. Sustainable development theory provides a balance in satisfying the needs of present and future generations. Today's understanding of sustainable development is presented as a combination of social, economic and environmental dimensions in corporate and public decision making within complete participation and contribution (Indicators of Sustainable Development, 2007).

National sustainable development strategies (NSDSs) play a vital role in pursuing sustainable development (SD) at the country level. These strategies help in clarifying priorities and in focusing efforts to more effectively address relevant SD issues. Since its establishment in 1992, the United Nations Commission on Sustainable Development has urged its members to formulate and implement their respective NSDS (Lagarde, 2006; Gale, 2022).

Europe has positioned itself as a progressive global player in environmental and sustainable development (SD) policies, and SD strategies should play a key role in better coordinating policies horizontally across sectors and vertically across levels of government (Steurer, Hametner, 2013).

Sustainable development is based on the following principles:

- Environmental quality: a lot of human activities are limited by the physical durability of the environment and it is emphasized that the

consumption of natural wealth must be reduced. If we want to provide conditions for a healthy life and development for future generations, we should comply with these restrictions.

- Future: it is important to have the awareness of future generations and the satisfaction of their needs that we have influence on and that we are responsible for.
- The quality of life: apart from material, each of the human activities has a social, cultural, moral and spiritual dimension.
- Equity: wealth, benefits and responsibilities should be fairly distributed among countries as well as among different social groups within the society. The needs and the rights of the poor and of those who are not treated equally, regardless of the reason, should be taken into consideration. Precautions: this principle should be applied in the case when we are not sure how a certain act or an event can have impact on environment.
- Comprehensiveness: all factors that affect a problem should be taken into consideration when solving complex problems (National strategy of sustainable development in Republic of Serbia).

Solving a complex problem of sustainability requires participation of all relevant factors that affect the problem in order to solve it. Many different approaches for national sustainable development strategies (NSDS) have been proposed since 1992, with some components common to all. A country's national strategy should be designed to help mainstream environmental concerns into policy. More broadly, it should coordinate local policy with global concerns, as well as integrate scientific knowledge into policy and development planning (Bajracharya et al., 2022; Kauffer, Maganda, 2022).

### ***Dimensions and the principles of sustainable development***

Sustainable development means the inclusion of economic, social and environmental aspects, as well as aspects of institutional development, most often those related to good governance. These aspects are often called pillars or dimensions of sustainable development. These pillars should be interconnected and these connections realized. In addition to environment, economic, social and cultural values are resources we should obtain for future generations. Special attention must be paid to the relationships among of all these three dimensions of sustainable development, as well as to their influences they have on each other (Otterstad, 2008).

At the United Nations Conference on Environment and Development – UNCED held in Rio de Janeiro in 1992, a detailed information about sustainability was given for the first time and a national strategy on sustainability was required. On this occasion, some important documents were adopted: Climate Change Convention and the Convention of Biological Diversity. Agenda 21 is a global action plan with regard to sustainable development where activities at all levels are represented. The structure of Agenda 21 is constructed so that it considers all relevant aspects of sustainable development: fight against poverty, gender equality, climate protection, exploitation of natural resources, protection of diversity, etc. (UN CSD Indicators of Sustainable Development, 1992).

Declaration from Rio and Agenda 21 emphasize two most important principles of sustainable development: integration of economic, social and environmental priorities and the participation of all interested parties in the process of development. In compliance with UN requests, National Strategies for Sustainable Development (NSSD) are emerging around the world. With these strategies, countries are supposed to halt or reverse trends that conflict with sustainable development (Zeiger et al., 2018).

The first principle means that sustainable development is based on the balance between economic, social and environmental objectives, when a community makes decisions. The second principle emphasizes the importance of participation and it is given as equal importance as in Agenda 21. Chapter 23 states that one of the basic preconditions for sustainable development is public participation in decision making.

Further development leads to the fact that sustainable development is based on the following assumptions:

- balanced exchange between mankind and the environment
- systemic (holistic) approach to the conservation of feedback and cyclic processes in society
- long-term responsibility for future: consideration and the change the way of thinking from present to future generation, as well as the efficiency of investment and a change of mentality
- efficiency and conservation of natural resources
- use of renewable energy sources
- innovation and inventiveness

## **CHANGES IN THE EDUCATION SYSTEM**

Changes in the education system of the Republic of Serbia have occurred in the last few years. They relate to the digitization of education,



the introduction of new technologies and methods, short study programs, dual education, lifelong learning and improving the quality of education. We are working on greater interdisciplinarity, new programs and directions that include sustainable development.

New models of education and new technologies contribute to a better connection between companies and educational institutions. That interaction brings mutual benefits for everyone and leads to economic development. (Trifunović et al., 2021).

In the last few years, the Republic of Serbia has been making significant efforts to adapt the education system to the needs of the economy and provide necessary skilled labor force. Accordingly, it has directed great efforts towards dual education. One of the main advantages of this type of education is the fact that upon completion of such studies, students are able to work in the chosen field, because their knowledge and experience is already adapted to the needs of the economy (Obradović, Dmitrović, 2022).

The dual education system provides a more efficient response to the needs of the economy and the labor market, technological change and the need for new competencies - knowledge, skills, abilities and attitudes (Ministry of Education, Science and Technological Development, 2022). Serbia is working on making dual education only a supplement to the current model of vocational education, and that is why it differs from the model in other European countries (Grujić, 2021).

Today, the system of dual education is at the level of secondary and higher education in Serbia. The goal of dual education is to improve human capital through faster integration of secondary school and university students into the world of work. It is regulated by the Law on Dual Education and the Law on the Dual Model of Studies in Higher Education. In addition, the development of dual education is regulated by the Master Plan for the Implementation of the Law on Dual Education (Ministry of Education, Science and Technological Development, 2022).

The Law on Dual Education was passed in 2017, and its implementation began in the school year 2019/2020. The law regulates the rights and obligations of stakeholders who participate in the dual model of teaching in secondary vocational education. The Ministry of Education was in charge of creating the Law on Dual Education, and it is envisaged that the entrusted tasks will be carried out by the Serbian Chamber of Commerce. Other partners were other relevant institutions - representatives of various ministries, educational institutions, employers, representatives of local self-government, the National Employment Service and other actors. According to the Law on Dual Education, it is a model of teaching

in the system of secondary vocational education and upbringing in which the curriculum is taught in two places, i.e. at school and in a company (with an employer), which means that students acquire competencies, both in the school through theoretical classes and exercises, and in the company in which learning through work is performed, all in accordance with the standard of qualification and the curriculum (Grujić, 2020).

Currently, about 30% of vocational schools in Serbia have at least one dual educational profile (Grujić, 2021). The system of dual education includes over 10,000 students. The number of dual educational profiles, which are implemented in over 150 secondary vocational schools, has grown to 54. The National Online Database of Dual Profiles has been created, which contains 764 units. Teaching contents were recorded in equipped classrooms-workshops and training centers, as well as in some companies that educate a significant number of students with dual educational profiles. Topics for learning through work were recorded in real work environment with licensed instructors and coordinators. The provided materials enable students who finish primary school to be informed about the manner of realization of dual education, so that they can decide on a future profession. The online database of lectures will also be used in regular classes, so that students who are not able to learn in real work environment can use the simulation to network theoretical knowledge with practice (Ministry of Education, Science and Technological Development, 2022).

Dual education in secondary schools was followed by the introduction of the dual model in higher education and it began in 2019 with the Law on the Dual Model of Studies in Higher Education (Grujić, 2021). The dual model of studies has been applied in the Republic of Serbia for a short time and this Law regulates basic issues related to this model of education, such as defining the content and implementation of this model, rights and obligations of students, employers and higher education institutions, etc. (Obradović, Dmitrović, 2022).

In order to realize the dual model of studies, the study programme should be accredited in accordance with the accreditation standards established by the law governing higher education and the qualification standard determined in accordance with the law governing the national qualifications framework (Law on the Dual Model of Studies in Higher Education, 2019).

The dual study model can be accredited as an independent study programme or as one of the modules within the study programme. In addition to the elements prescribed by the law governing higher education and accreditation standards, it contains a description and scope of learning

through work expressed in hours and ECTS credits (Law on the Dual Model of Studies in Higher Education, 2019).

Employers also participate in the development of study programmes or modules, in accordance with the law governing higher education (Law on the Dual Model of Studies in Higher Education, 2019).

The goal of introducing the dual model in higher education is to provide students with the opportunity to significantly increase their competitiveness in the labor market and have greater chances to be employed by employers with work-based learning, but also by other employers in the same field. According to the dual model, a higher education institution can organize a study programme of academic or vocational studies, in which through active teaching at a higher education institution and practical training and work with an employer, knowledge, skills, abilities and attitudes are acquired in accordance with the study programme and qualification standard (Ministry of Education, Science and Technological Development, 2022).

In this way, it is possible for students to have the opportunity to learn through work during their studies. "Learning through work" is an integral part of the study programme according to the dual model of studies that carries a number of ECTS credits and is an organized process during which students under the supervision of a mentor working with an employer apply theoretical knowledge in real work environment. They have direct contact with business procedures and technologies used in the business world, they connect with professionals and prepare themselves for the world of work (NAT, Rulebook, 2020). The ratio in the volume of hours of teaching performed at a higher education institution and learning through work with an employer is determined by the study programme, with teaching (lectures, exercises and other forms) represented with at least 450 hours per year on average at the level of the entire study programme, and learning through work with at least 450 hours per year on average at the level of the entire study programme (Ministry of Education, Science and Technological Development, 2022).

Before enrolling in a faculty, students can decide whether they want dual education or classic study programmes. Faculties define in their regulations that a student who opts for dual education can return to the classic way of studying and vice versa - that a student who has decided to study in the classic way can switch to dual education. Through this form of education, although more demanding and difficult, young people acquire practical skills and abilities that will enable them easier entry into the world of work, as well as competencies for career management, lifelong learning and entrepreneurship. This form of education enables employers to

participate in the education of future staff. In the long run this reduces costs of searching for qualified staff (Grujić, 2021).

Studies according to the dual model cannot be introduced in the field of social sciences and humanities (NAT, Regulations, 2020).

The dual model of studies in higher education, which began with the implementation of the first study programmes in October 2021, contributes to increasing the relevance of higher education, employability of graduates, modernization of the teaching process through cooperation with the economy and contact with modern technological achievements (Ministry of Education, Science and Technological Development, 2022).

In addition to dual education, another model based on connecting education and the economy are short study programs. Since 2019, short study programs have been introduced for the professional training of persons with acquired secondary education for inclusion in the work process, which have a clearly defined structure, purpose and learning outcomes and for which a certificate is issued on the completed short study program and acquired competencies (Law on Higher Education).

Short programs provide much better and more efficient training and preparation for specific jobs in specific jobs/occupations. As a rule, these programs are aligned with market requirements. Short programs consist of active teaching that includes theoretical lectures and practical exercises (that is, integrated lectures and exercises) and additional practice/training at the workplace in the amount of 10-30% of the hours of active teaching. The teaching of short programs can be organized through a block system, that is, as a concentrated teaching of only one subject with a check of acquired knowledge and skills, immediately after the end of the course teaching (NSVO, Rulebook, 2019).

Short study programs are a good model for the connection between the economy and education and the possibility for employees to receive additional education at higher education institutions for a specific field or occupation that is required for work, as well as additional education related to sustainable development.

Realization of those models of additional education is possible thanks to new technologies and digitization in education.

The use of modern technologies enables the transfer of the digital experience of students and the educational process, simplifies the learning process, enables collaboration among students, including access to mobile applications and social media, while enabling the development of knowledge, abilities and skills needed for the labor market. The possibility of using the platform for online studies enables employees to get additional education. Employees spend their working hours at work and the traditional

way of additional education, which involved attending the faculty, was not feasible. In this way, when they have access to education online and when they are not obliged to physically attend lectures, they have the opportunity to further improve their skills (Stojanović et al., 2021).

## **RESEARCH METHODS**

The research, which will be presented in this paper, was conducted on the territory of the Republic of Serbia in the period from March to June 2022. The focus of this research is on the collaboration between businesses and educational institutions, which encompasses investments in human resources, additional education, and employee training. The subject of the research is the presentation of the importance of additional education and training, investment in human resources and cooperation between companies and educational institutions. The goal of the research is the presentation of the situation in the Republic of Serbia regarding investment in additional education of employees, cooperation with educational institutions and the attitude towards education for sustainable development.

Bearing in mind the goals of the research and the phenomenon that the research deals with, the research method was chosen as the most adequate approach to the research. The applied research method involves the use of a survey, that is, the collection of descriptive data based on structured questionnaires. The basic instrument in the examination is the questionnaire. The data were collected by direct and personal surveys or by sending questionnaires via e-mail. Companies from different industries are included. The research was based on a survey of management and employees who had the necessary information and could answer the questions in the survey. The questionnaire contains a total of 16 questions, which are completely closed.

The questions are organized into three groups. The first group of questions is related to the company's investment in the additional education of employees and the motivation of employees to receive additional education. Also, the dynamics of investments in additional education in the previous five years, in the period from 2017 to 2022, is included. The second group of questions is related to cooperation in the past with educational institutions, dual education, the number of students and high school students on internships, as well as the dynamics of cooperation by age in the last ten years. In addition, more cooperation in scientific fields and professional areas is covered, where we also see the share of areas related to the environment and the representation of this type of cooperation in companies in the Republic of Serbia. The third group of questions is

related to the attitude of companies regarding additional education related to sustainable development.

The research sample is 100 surveyed companies. The companies are from different industries and of different sizes. The sample includes companies that are among good companies in Serbia based on the criterion of realized business income, and which were ready for cooperation. The possible limitation of this research is the potential for insincere responses and superficiality in certain questionnaire answers.

The following hypotheses are tested in the research:

H<sub>1</sub>: Investment in additional education and training of employees positively impacts the development of companies, as well as the ability to monitor major environmental changes and development trends.

H<sub>2</sub>: Greater collaboration between businesses and educational institutions leads to new models of education and increasing alignment of the education system with the needs of the economy.

H<sub>3</sub>: A quality education system leads to greater implementation of sustainable development and environmental protection.

## RESULTS AND DISCUSSION

After the conducted research, data processing followed, which was shown through tabular and graphic displays. The following five tabular and eleven graphical representations are presented.

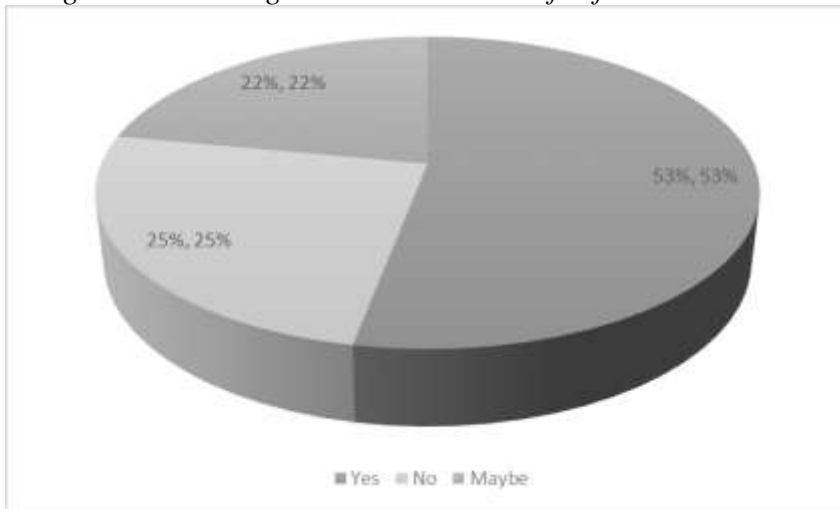
The first table shows the basic data related to the number of surveyed companies, which is 100 from different industries, of different sizes, so the average number of employees is 478. The average number of highly qualified employees is 112.

*Table 1: Number of employees and highly qualified employeed*

The total number of surveyed companies	Average number of employees	Average number of highly qualified employees
100	478	112

*Source: Authors' illustration based on research*

*Figure 1: Investing in human resources for further education*



*Source: Authors' illustration based on research*

Figure 1 shows companies that invest in human resources for additional education. Investment in human resources can include investment in additional training of employees, additional education, courses, seminars, short study programs, etc.

There are two tabular presentations that show the investment in human resources for additional education and training. Table 1 shows investment in human resources for additional education at undergraduate, master's, specialist and doctoral studies. The highest percentage is those who declared that they invest in employees to complete academic studies, while the lowest percentage is investment in doctoral studies. Table 3 shows different types of additional education and the companies' investments in them. Additional courses and training, professional courses, specializations and other types of investment are listed. Companies allocate the most funds for employees' additional courses and training (58%). In the second place are professional courses with 44%, then different types of investment and specialization with 21%.

These are good indicators, and additional investment in employees' education is needed, because information and knowledge are the most important competitive weapons at any time and lead to a better quality of life and sustainable development. In the 21st century, acquiring knowledge is not a big deal, but applying the acquired knowledge. Only intelligent people can make a decision where and when they can apply the acquired knowledge and thus give the best results (Vargas-Hernández, 2010).

*Table 2: Presentation of investments in human resources for additional education*

<b>Level of studies</b>	<b>Yes</b>	<b>No</b>	<b>No response</b>
Undergraduate studies	37%	58%	5%
Master's studies	24%	65%	11%
Specialist studies	16%	70%	14%
Doctoral studies	7%	78%	15%

*Source: Authors' illustration based on research*

*Table 3: Presentation of investments in human resources for additional education*

<b>Type of investment</b>	<b>Yes</b>	<b>No</b>	<b>No response</b>
Additional courses and training	58%	39%	3%
Professional courses	44%	48%	8%
Specialization	21%	70%	9%
Other types of investment	38%	45%	17%

*Source: Authors' illustration based on research*

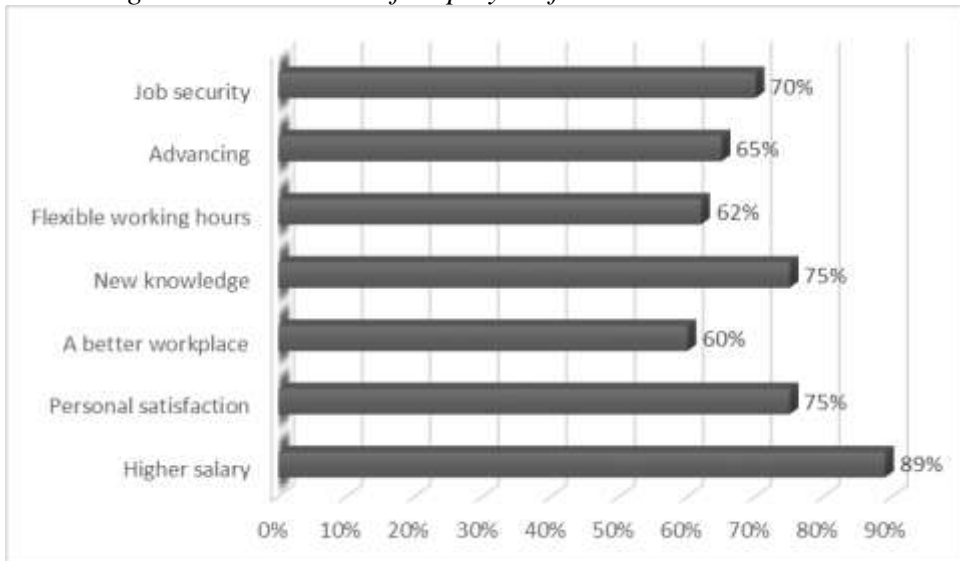
Knowledge embedded in human capital enables companies to improve their competencies and discover new innovative opportunities. When companies develop new products, new processes, they need the motivation, ability and new knowledge of human capital to produce creative ideas, develop innovative approaches and create new opportunities (Chen & Huang, 2009). Development of new products and services implies extensive and intensive knowledge activities. New ventures mainly depend on the knowledge and skills of employees, as key inputs in the process of knowledge creation (Huang & Tsai, 2009).

Investment in human resources through programs of additional education (undergraduate, master's, specialist or doctoral studies) or additional training (training, professional courses, specialization or other types of investment) by companies allows employees to implement new scientific knowledge in their companies.

The second figure shows what motivates employees to get additional education. We can see that in the first place, a higher salary is the main motive that drives employees to additional education (89%). This is followed by personal satisfaction and new knowledge (75%) each, which is a good indicator. This is followed by job security (70%), advancement (65%) and better working conditions (60%).



*Figure 2: Motivation of employees for additional education*



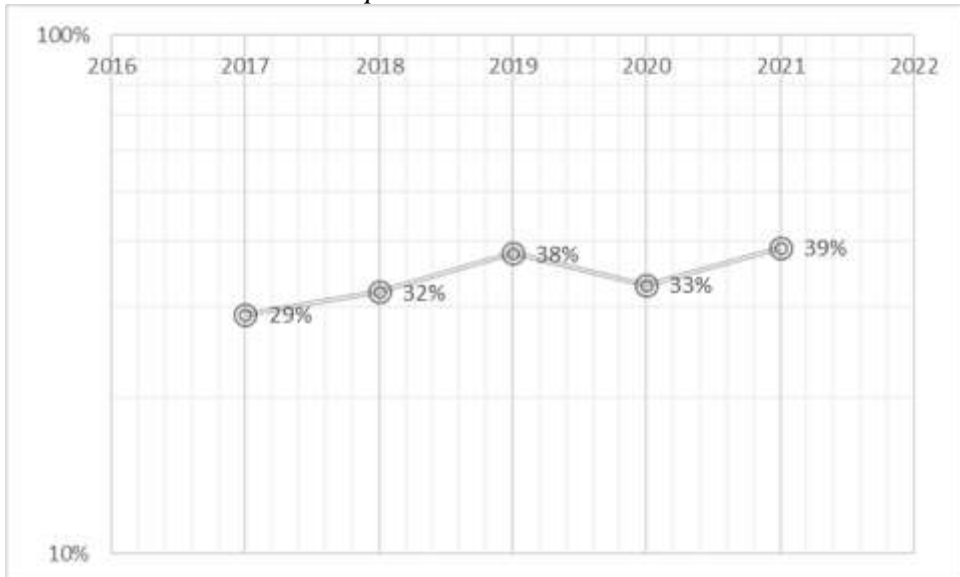
*Source: Authors' illustration based on research*

The third figure shows the investment in employees to receive additional education in the last five years, in the period from 2017 to 2022. We see the dynamics of investment growth by year, with the exception of 2020, where there was smaller decline, which was probably caused by the state of emergency due to COVID 19.

The first hypothesis ( $H_1$ ) posits that investment in additional education and training of employees has a positive impact on the development of the company, monitoring of major environmental changes, and development trends. The previous graphical representations and tables confirm this hypothesis, as we can see a large percentage of investment in employees, which increases linearly year by year.

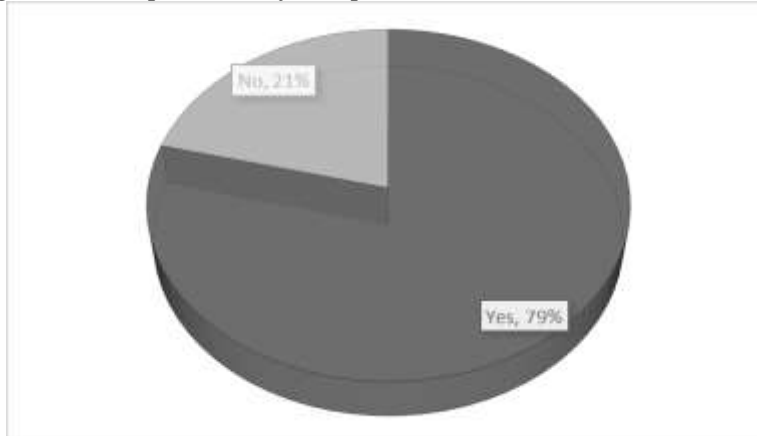
Figure 4 shows in what percentage companies achieve some form of cooperation with educational institutions. It can be seen that a large number of companies answered that they have some form of cooperation with educational institutions (79% answered positively). The remaining 21% answered negatively. A good indicator is the high percentage of affirmative answers. This type of cooperation brings great benefits for companies and educational institutions. Cooperation between companies and higher education institutions leads not only to their development, but also to the increased expertise of human resources, increased innovation and economic development (Trifunović et al., 2021).

*Figure 3: Investment in employees to acquire additional education in the period 2017-2022*



*Source: Authors' illustration based on research*

*Figure 4: Cooperation of companies with educational institutions*



*Source: Authors' illustration based on research*

This type of cooperation is extremely important and can be realized in various ways through the development of new academic programs, joint research projects, seminars, presentations at fairs, etc. (Polovina et al., 2020). In addition, it is possible to invest in employees to get additional education, sending employees to short study programs, accepting undergraduates or high school students for internships, etc.

Table 4 shows the cooperation between companies and educational institutions by educational and scientific fields. Scientific fields are natural - mathematical sciences, technical-technological sciences, social sciences and humanities, medical sciences and art (NSVO, Rulebook). The broadest type of cooperation is achieved with educational institutions in the field of technical and technological sciences (58%), then with natural-mathematical (15%), social-humanistic (15%), and the least in art 2%.

*Table 4: Cooperation of companies with educational institutions by scientific fields*

Scientific fields	Yes	No
Natural - mathematical sciences	15%	85%
Technical - technological sciences	58%	42%
Social sciences and humanities	15%	85%
Medical sciences	10%	90%
Art	2%	98%

*Source: Authors' illustration based on research*

Table 5 shows the cooperation of companies with educational institutions by professional areas, where the areas marked in the questionnaires are extracted. It is a good indicator that there are a lot of marked areas related to environmental protection and sustainable development with a high percentage. Also, when looking at the results of the accreditation of the National Body for Accreditation and Quality Assurance in Higher Education (NAT), it can be seen that the number of accredited study programs related to environmental protection and sustainable development has increased (NAT, Accreditation Outcomes).

Figure 5 shows companies that accept students or high school students for internships and the percentage. The figure shows that companies accept undergraduates and high school students for internships. The percentage of companies that accept high school students for internships is 55%, and there is 45% of negative answers. This is a good indicator for dual education and work-based learning to ensure qualified workforce.

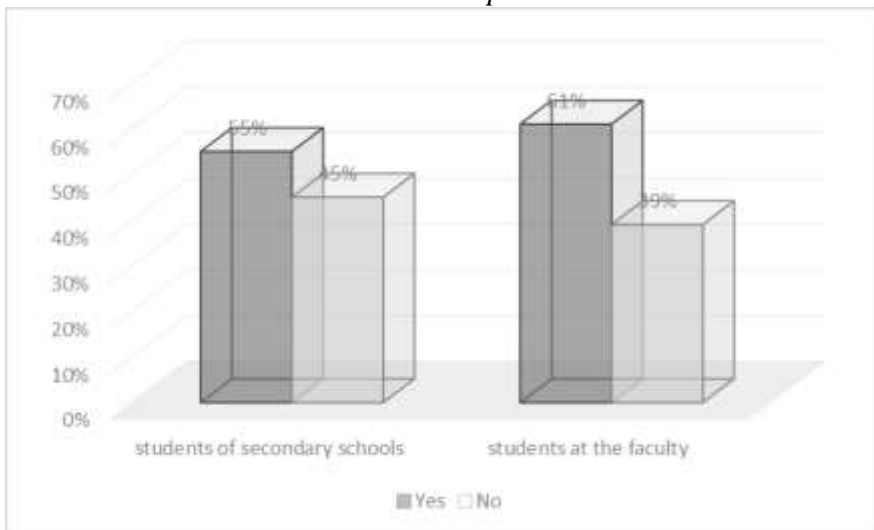
The percentage of companies accepting students for internships is 61%, while the number of negative responses is 39%. This is a good indicator, because in this way workforce that will be ready for the labor market is ensured.

*Table 5: Cooperation of companies with educational institutions by professional areas*

Professional areas	Yes
Industrial engineering and engineering management	10%
Environmental protection and occupational safety engineering	20%
Biotechnical sciences	15%
Economic sciences	25%
Management and business	22%
Cultural sciences and communicology	15%
Technological engineering	10%
Environmental sciences	14%
Computer sciences	37%
Political sciences	5%
Legal sciences	5%

*Source: Authors' illustration based on research*

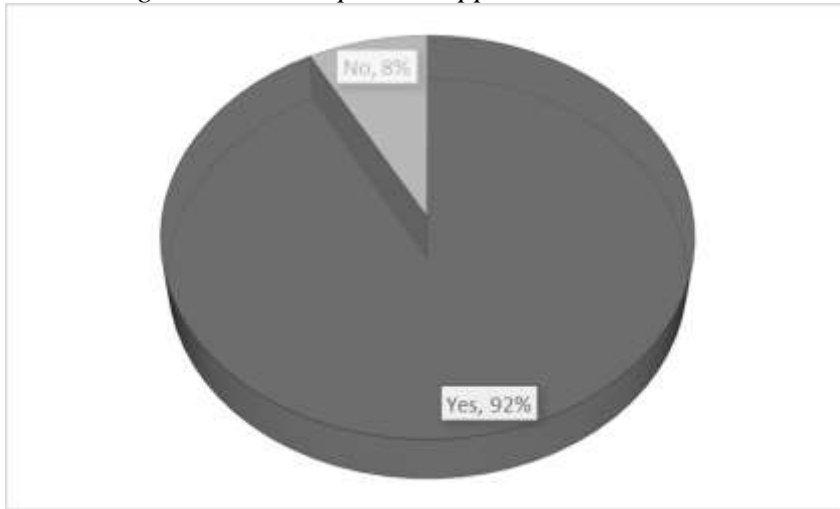
*Figure 5: Companies accepting students or high school students for internships*



*Source: Authors' illustration based on research*

Figure 6 shows the attitude of the company regarding dual education. This picture shows that 92% responded positively about dual education, while 8% responded negatively. This is a good indicator, because dual education is in the interest of both companies and high school students. Companies need qualified workforce that meets the needs of the market. In dual education, students acquire competencies through theoretical teaching at school, practical teaching at school and learning through work with employers (Reynold et al., 2021).

Figure 6: Do companies support dual education?



Source: Authors' illustration based on research

Figure 7: Cooperation in the period from 2012 to 2022

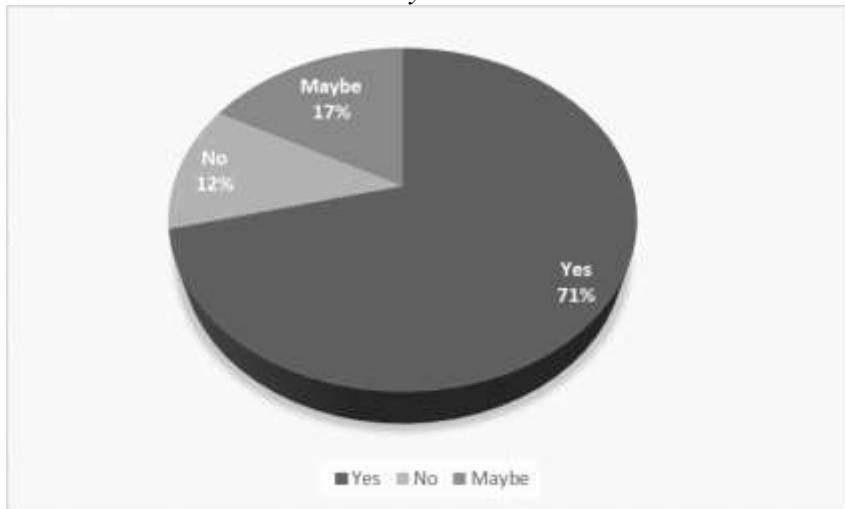


Source: Authors' illustration based on research

The second hypothesis ( $H_2$ ) posits that greater collaboration between businesses and educational institutions leads to new models of education and better alignment of the education system with the needs of the economy. The hypothesis is supported by the data presented in figures 4, 5, 6, and 7, as well as tables 4 and 5, which indicate a linear increase in collaboration over the years, with a predicted trend of continued growth. The following are four graphic presentations related to the company's attitude towards education for sustainable development. The questions refer to the company's approach to sustainable development, the goal of environmental education and training people for positive environmental

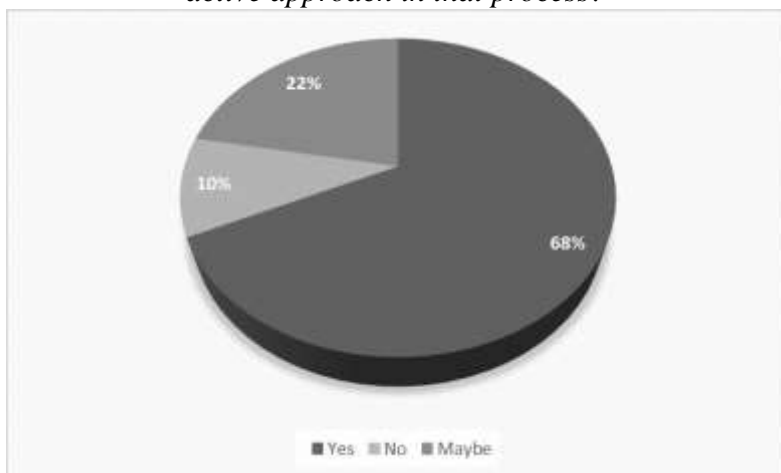
changes, opinions on the inclusion of education for sustainable development at all levels and the implementation of specialized programs for sustainable development.

*Figure 8: Should procedures for implementing the concept of sustainable development be sought in the knowledge economy, that is, in a better education system?*



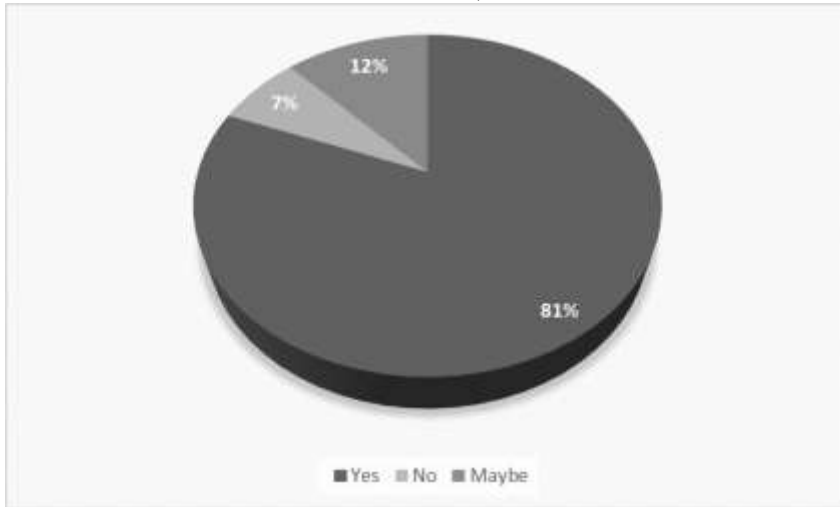
*Source: Authors' illustration based on research*

*Figure 9: Do you think that the overriding goal of education for the environment and sustainable development represents training people to fight for positive changes in the environment, which implies their engaged active approach in that process?*



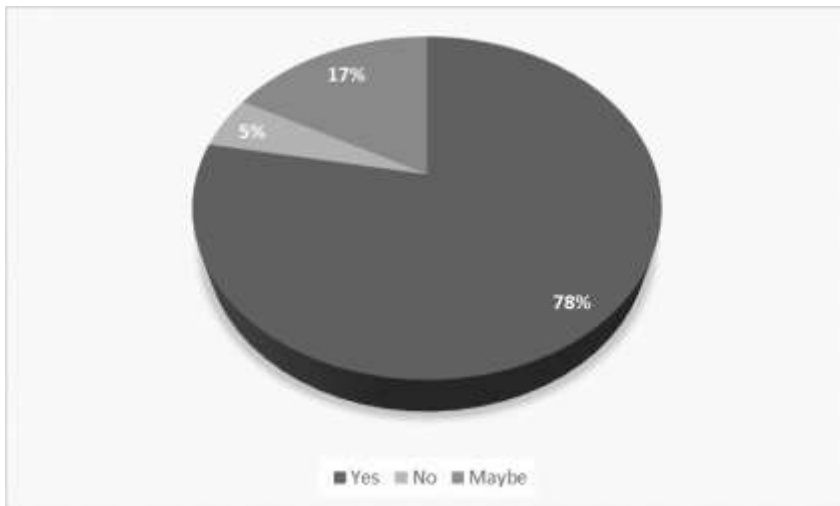
*Source: Authors' illustration based on research*

*Figure 10: Do you think that the concept of sustainable development should be included in educational programs at all levels, including the creation of conditions for long-term learning (advancement of knowledge, lifelong learning, introduction of innovations, accessibility and quality of education)?*



*Source: Authors' illustration based on research*

*Figure 11: Do you think that it is necessary to implement specialized training programs so that all sectors of society have the knowledge, skills and habits needed to live in a sustainable way?*



*Source: Authors' illustration based on research*

Based on the presentation of the part of the research that is related to the attitude of companies regarding education for sustainable development, we can conclude that: 1. companies believe that a good setting of the concept of sustainable development should be based on the knowledge economy and start from a quality education system; 2. companies believe that the primary goal of education for the environment and sustainable development is to train people to fight for positive changes in the environment; 3. companies believe that the concept of sustainable development should be included in educational programs at all levels, including the creation of conditions for long-term learning (improvement of knowledge, lifelong education, introduction of innovations, availability and quality of education); 4. it is necessary to carry out specialized training programs so that all sectors of society have the knowledge, skills and habits needed to live in a sustainable way. The analysis presented in this section of the research leads to the conclusion that the third hypothesis ( $H_3$ ), which states that a quality education system leads to greater implementation of sustainable development and environmental protection, has been confirmed.

## CONCLUSION

The new concept of education should integrate knowledge and the way of finding the best techniques and methods in all spheres of human life, and provide necessary conditions for the application of the concept of interdisciplinary education for sustainable development. To this end, it must ensure the participation and mutual cooperation of all interest groups (schools, the economy, decision-makers, society, etc.) and intensive strengthening of cooperation with educational institutions. The initial conditions necessary for the establishment of a sustainable education system are, first of all, more significant channeling of funds into investments in education, in order to increase the general literacy of the population, reduce the share of the population without occupation and harmonize the education system with the needs of the labor market and reforms (Radojević et al, 2011).

This paper shows the strengthening of the education system, sustainable development, changes and directions of education development that lead to the connection of education and the economy. The Republic of Serbia, as a response to the needs of society for qualified workforce that will be immediately ready for the labor market (Stojanović et al., 2021),



but also solving the issue of youth unemployment and modernization of the education system, turned to dual education and its application in secondary education from the 2019-2020 school year. Dual education is a model of teaching and learning in the system of secondary professional education and upbringing. In dual education, students acquire competencies through theoretical teaching at school, practical teaching at school and learning through work with employers (Renold et al., 2021). The introduction of the dual model in secondary education was followed by its introduction in higher education from the 2020/21 academic year.

In addition to dual education, short study programs are also shown as another way to connect educational institutions and companies and thereby involve young people in the work process more quickly. The use of modern technologies (mobile devices, internet and social software) in education contributes to development and improvement of the need for practical skills that are necessary in the economy. The educational system is digitized and uses new approaches and technologies in education, which lead to the training of employees and thus the achievement of a greater competitive advantage of the economy (Stojanović et al., 2021). In this way, additional education and training become more easily available, which affects the increase in the level of education.

Conclusions reached in this paper based on the research conducted at the beginning of 2022 are divided into three parts. Within the first part, the conclusions are: companies understand the importance of investing in human resources for additional education and training and the percentage of investment is high; 2. It is invested in additional education of employees, mostly in undergraduate studies, as well as in additional education, mostly in training and professional courses; 3. A high percentage of employees is motivated for additional education; 5. there is dynamics of investment in human resources that has been increasing year by year in the last five years and the forecast is the continuation of the increase.

Within the second part of the research, the conclusions are: 1. there is a high percentage of some kind of cooperation between companies and educational institutions; 2. within the framework of cooperation with educational institutions, a large percentage is within scientific fields and professional areas related to sustainable development and environmental protection; 3. the increase of the number of accredited study programs related to environmental protection and sustainable development; 4. companies support dual education and cooperate with educational institutions and accept high school students and undergraduates for internships; 5. there is dynamics of cooperation in the last ten years and it

is increasing from year to year with predictions for the next three years which are good and in the development phase.

In the third part of the research, the conclusions are: 1. companies believe that a good setting of the concept of sustainable development should be based on the knowledge economy and start from a quality education system; 2. the goal of education for the environment and sustainable development is to train people to fight for positive changes in the environment; 3. companies believe that the concept of sustainable development should be included in educational programs at all levels, including the creation of conditions for long-term learning (improvement of knowledge, lifelong education, introduction of innovations, availability and quality of education); 4. it is necessary to carry out specialized training programs so that all sectors of society have the knowledge, skills and habits needed to live in a sustainable way.

## REFERENCES

1. Bajracharya R., Shakya S. R., Sharma A. (2022). *Energy and environment*, Handbook of Energy and Environmental Security, 469-480
2. Blanuša A., Petrović S., Žikić S., Trifunović D. (2022). The influence of local self-government on sustainable development of agricultural potential, *Ecologica*, 29 (105), 1-8.
3. Chen, C., Huang, J. (2009). Strategic human resource practices and innovation performance, The mediating role of knowledge management capacity, *Journal of Business Research*, 62, 104-114.
4. Dual education law (2020). <https://www.paragraf.rs/propisi/zakon-o-dualnom-obrazovanju.html>
5. Erceg, Ž., Starčević, V., Pamučar, D., Mitrović, G., Stević, Ž. And Žikić, S. (2019). A new model for stock management in order to rationalize costs: ABC-FUCOM-interval rough CoCoSo model, *Symmetry* 11(11). Doi: 10.3390/sym11121527
6. Gale R. (2022). *The war against sustainable development theory: Public interest as the ethical order for the 2030 Sustainable Development Goals*. Geographical Research.
7. Giddings B., Hopwood B., Brien G. (2002). Environment, economy and society: fitting them together into sustainable development. *Sustainable Development*. 10 (4), 187-196.

8. Grujić, G. (2020). *National model of dual education: The road to the future of Serbia*. Ministry of Education, Science and Technological Development
9. Grujić, G., (2021). Dual Education in the Republic of Serbia, *Chinese Business Review*, 20 (4), 140-147
10. Hediger, W. (2006). Weak and strong sustainability, environmental conservation and economic growth, *Natural Resource Modeling*, 19 (3), pp. 359–394.
11. Indicators of Sustainable Development: Guidelines and Methodologies, (2007). Third Edition
12. Jun Yu, Lin Zhu (2022). Corporate ambidexterity: Uncovering the antecedents of enduring sustainable performance, *Journal of Cleaner Production*, 365, 132740.
13. Kalagbor, A. N. (2022). Service Failure, Recovery and Sustainable Development: Towards Justice in the Extractive Industry of Nigeria, In: *Microfinance and Sustainable Development in Africa*, 234-263. Doi:10.4018/978-1-7998-7499-7.ch010
14. Kauffer, E., Maganda, C. (2022). The adoption of global water norms in Central America: What separates normative coherence from normative hegemony?, *Development Policy Review*, 40(S1), DOI:10.1111/dpr.12626
15. Ketata, I., Sofka, W., Grimpe, C. (2014). The role of internal capabilities and firms' environment for sustainable innovation: evidence for Germany, *R&D Management*, 45(11), 60-75. DOI:10.1111/radm.12052
16. Lagarde M. L. (2006). Mainstreaming sustainable development: Evolving perspectives and challenges from the Philippine experience, *Natural Resources Forum*, 30 (2), 111-123.
17. Law on the Dual Model of Studies in Higher Education, (2019). <http://www.pravno-informacioni-sistem.rs/SIGlasnikPortal/eli/rep/sgrs/skupstina/zakon/2019/66/1/reg/>
18. Li, Y., Huang, J., Tsai, M. (2009). Entrepreneurial orientation and firm performance: The role of knowledge creation process, *Industrial Marketing Management*, 38(4), 440-449.
19. Mantlana, K.B., Maoela, M.A. (2019). Mapping the inter-linkages between sustainable development goal 9 and other sustainable development goals: A preliminary exploration, *Business Strategy and Development*, DOI:10.1002/bsd2.100
20. Ministry of Education, Science and Technological Development (2022). <https://mpn.gov.rs/prosveta/dualno-obrazovanje/>

21. Mitić, N., Žikić, S., Trifunović, D. (2022). Integral personnel planning in the field of sustainable development, *Ecologica*, 29 (105), 79-88.
22. National Council for Higher Education (2019). Rulebook on organization, implementation, issuing of certificates and record keeping procedure for short study programs.
23. National Council for Higher Education, Rulebook on scientific, artistic, i.e. professional fields within educational-scientific, i.e. educational-artistic fields.
24. National body for accreditation and quality assurance in higher education (2022), Outcomes of accreditation, Ishodi akreditacije – Nacionalno telo za akreditaciju i obezbeđenje kvaliteta u visokom obrazovanju (NAT).
25. Nasr, J.B., Snoussi, C., Chaar, H. (2022). Family Farms Sustainability in Rural Semi-arid Areas: Case of Bargou-Siliana in Tunisia, In: *Sustainable Energy-Water-Environment Nexus in Deserts*, pp. 713-718. DOI:10.1007/978-3-030-76081-6\_89
26. National accreditation body, (2020). Rulebook on Amendments to the Rulebook on Standards and Procedure for Accreditation of Study Programs
27. Obradović, J., Dmitrović, M. (2022). *Dual higher education - a symbiosis of theory and practice*, XXVIII Conference Development Trends: University Education for Business, Kopaonik, 14-17.02.2022., Paper No.T3.1-6 06236
28. Otterstad, O. (2008) Sustainable Development in Fisheries: Illusion or Emerging Reality? *Sociologia Ruralis*, 36 (2), 163-176. DOI:10.1111/j.1467-9523.1996.tb00013.x
29. Polovina, A., Mijušković, Lj., Kikinđanin, Lj, Milić, B. (2020). *Lifelong learning: new opportunities for university-business collaboration*, VII Meeting Development Trends: EUROPE 2020: A Knowledge-Based Society. Kopaonik. Paper No. B1.1-9, pp. 1-4
30. Radojević, D., Radović, N., Džepina, M. (2011). National Strategy for Sustainable Development - Education for Sustainable Development, University and Sustainable Development, FON, str.105
31. Renold, U., Caves, K., Oswald-Egg, M.E. (2021). *Implementation of the Law on Dual Education*, Fourth Report on Obstacles and Drivers in the Implementation Phase, CES Studies 14

32. Steurer, R., Hametner, M. (2013). Objectives and Indicators in Sustainable Development Strategies: Similarities and Variances across Europe. *Sustainable Development*, 21 (4), 224-241
33. Stojanović, J., Nešić, Z., Bulut Bogdanović, I. (2021). Digitalization of education in the function of economic development, *Social horizons*, 1(1), 2021, 29-40
34. Tacon, A.G.J., Metian, M., McNevin, A.A. (2022). Future Feeds: Suggested Guidelines for Sustainable Development, In: *Reviews in Fisheries Science & Aquaculture*, 30 (2), 135-142.
35. Trifunović, D., Lalić, G., Radovanović, Z. (2021). *New technologies and models of education in the function of human resources development*, V International Scientific Conference - Regional Development and Cross-Border Cooperation, Pirot, Serbia, pp. 339-349.
36. Trifunović, D., Mitrović, R., Pejović, B. (2019). Dynamics of investment in innovation and new technologies in higher education institutions, *Megatrend Review*, 16 (2) 2019, 169-182.
37. Vargas-Hernández, J.G. (2010). How Intellectual Capital and Learning Organization Can Foster Organizational Competitiveness?. *International Journal of Business and Management*, 5 (4), 183-193. DOI:10.5539/ijbm.v5n4p183.
38. Law on Higher Education (2021). "Sl. glasnik RS", no. 88/2017, 73/2018, 27/2018 - other laws, 67/2019, 6/2020 - other laws, 11/2021 - authentic interpretation, 67/2021 and 67/2021 - other. the law
39. Zeiger, B., Gunton, T., Rutherford, M. (2018). Toward sustainable development: A methodology for evaluating environmental planning systems, *Sustainable Development*, 27(4), 13-24. DOI:10.1002/sd.1852
40. Žikić, S., Trifunović, D., Randelović, M. (2020) Job satisfaction in the function of sustainable management of the hotel sector of Stara planina, *Ecologica*, 27(99), 530-536.
41. Žikić, S., Trifunović, D., Lalić, G., and Jovanović, M. (2022) Awareness of the population in rural regions of Serbia about renewable energy sources. *Economics of Agriculture* 69(1), 43-56. DOI: 10.5937/ekoPolj2201043Z