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FOREWORD

The International Research Academy of Science and Art is the host of the Second IRASA International Scientific Conference "SCIENCE, EDUCATION, TECHNOLOGY AND INNOVATION – SETI III 2021".

The conference is multidisciplinary oriented.

Thematic fields of the SETI III 2021 conference are the following:

- A. Science, technology and innovation**
- B. Education and knowledge for the 21 century**
- C. Preservation and improvement of the environment and human health**
- D. Governance and sustainable territorial development**
- E. National security and protection**

The **aims** of the SETI III 2021 Conference are the following:

- ◆ Improving knowledge basis for sustainable and resilient local, national, transnational and global development
- ◆ Support and harmonization of the implementation of sustainable development goals in society, economy, environment and urbanization
- ◆ Strengthening scientific, technological and innovative capacities at local, national and transnational level
- ◆ Recommendations for the improvement of education, research and security, and governance of the environmental, urban and territorial development
- ◆ Dissemination and intensification of professional communication and establishment of network for joint research, innovation and education
- ◆ Dissemination and intensification of professional communication and establishment of network for security challenges and risks in environment and society
- ◆ Experience Exchange Based on Best Practices

The **results** of the SETI III 2021 Conference are presented in two publications:

- ◆ The Book of Abstracts
- ◆ The Book of Proceedings.

Zagreb, September 2021

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KEYNOTE PAPERS



THE SPECIFIC IMPACT OF THE COVID-19 PANDEMIC ON AGRICULTURE AND NATURAL RESOURCES

Jelena Bošković¹; Vladica Ristić²; Jelena Mladenović³; Tanja Kvesić⁴

Abstract

The way the COVID-19 pandemic disrupted human lives and livelihoods constituted a stress test for functioning agriculture production, agro-ecosystems in developing countries, as part of rural and urban systems and the global economy. We applied two conceptual schemes to dissect the evidence in peer reviewed literature so far, as a basis for better understanding and enabling building back better. Reported positive impacts of the lockdown anthropause on environmental conditions were likely only short term, while progress towards sustainable development goals was more consistently set back especially for social aspects such as livelihood, employment, and income. The loss of interconnectedness, driving loss of assets, followed a collapse cascade that included urban to rural migration due to loss of urban jobs, and illegal exploitation of forests and wildlife. Agricultural activities geared to international trade were generally disrupted, while more local markets flourished. Improved understanding of these pathways is needed for synergy between the emerging adaptive, mitigative, transformative, and reimaginative responses. Dominant efficiency seeking strategies that increase fragility will have to be re-evaluated to be better prepared for further pandemics, that current Human Nature interactions are likely to trigger.

Key words: *COVID-19; pandemic; agriculture; natural resources; resilience.*

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CHALLENGES IN STRATEGIC POSITIONING OF SMALL OPEN ECONOMIES TOWARDS THE 5TH INDUSTRIAL REVOLUTION

Ernest Vlačić⁵

Abstract

The relocation of production capacities towards Asian and South American destinations in order to achieve lower production costs in the last fifth of the 20th century provoked sudden deindustrialization of strong global economic and industrial blocs, with the United States and Western European countries in particular leading the way. With the entry into the 4th industrial revolution, this trend began to change, and industrial production once again emerged out as the development and competitiveness backbone of national economies. Meanwhile, global economic crises are hitting the world hard and exposing the vulnerabilities of national economies, especially smaller post-transition economies where service rather than manufacturing often dominates in their GDPs. The question arises, what strategic direction in the context of the appropriate conjuncture of national economies to respond to the growing challenges of turbulent and uncertain global economic-technological race, especially in the event of a crisis? How these economies may confront such a challenging transition towards the 5th industrial revolution or future Society 5.0? In this paper, a selection of possible strategies for the case Republic of Croatia are projected, complemented with evaluations of plausible development scenarios.

Key words: *Small open economies; 4th industrial revolution; reindustrialization; strategic development.*

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THE ROLE OF HIGHER EDUCATION IN THE CREATION AND DEVELOPMENT OF THE KNOWLEDGE-BASED SOCIETY

*Jamila Jaganjac*⁶

Abstract

Higher education has a significant role in the creation and development of knowledge that, among other factors, affects the competitiveness of a country. Responding to the challenges of the modern global market, higher education institutions should establish the status of central knowledge producers acting in cooperation with the businesses, research centers, universities at the local and international level, as well as other sectors of the knowledge-based society. Using the World Bank's pillars of knowledge, this paper examines the correlation between indicators of higher education, technological readiness, innovation ecosystem, and the country's competitiveness on the example of Bosnia and Herzegovina. The paper also deals with the importance of the strategic approach to the development of study programs and internationalization.

Key words: *higher education, knowledge, networking, competitiveness, strategy.*

JEL classification: *I20*

Thematic field: B

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BIOGAS PRODUCTION SUSTAINABILITY CIRCLES

Gordana Dražić⁷; Nikola Dražić⁸; Nikola Rakašćan⁹; Ljubiša Živanović¹⁰

Abstract

The conversion of biomass energy in a biotechnological process based on the anaerobic digestion (AD) process was developed primarily as a renewable energy source (RES) with the initial goal of reducing greenhouse gas emissions into the atmosphere and thus mitigating climate change. The basic raw material is biomass of different origin: from livestock production / manure and animal residues /, from crop production / harvest residues, purpose-grown biomass of energy crops /; wastes from the food processing industry; biodegradable municipal waste, waste sludge from biological wastewater treatment plants and more. The main product in the AD process is biogas which can be further purified and used as a substitute for natural gas in stable and mobile systems or its energy is converted in cogeneration plants into electricity and heat energy. As a by-product, a digestate is formed (residue in the fermenter after the separation of biogas) which contains significant amounts of mineral nutrients for plants. Digestate is most often used as soil amendment, directly or after certain processing. When digestate is used as a substitute for mineral fertilizers on plots where agro-energy crops are grown, the cycles of mineral substances and carbon are closed. In order for this to be sustainable from the ecological, energy and economic aspect, a multidisciplinary and multisectoral approach is necessary.

Key words: *Biogas plants; Circulating economy; Digestat; Sustainable agriculture; Organic fertilizers.*

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MUTUAL INTERDEPENDENCE BETWEEN ENVIRONMENT AND BUILDING SITES

Vladica Ristić¹¹

Abstract

This paper analyses the correspondence between environmental natural factors and building sites with the aim to contribute to better understanding of mutual interdependence between environment and architecture. Despite the dynamic development of building techniques and technologies, due to immutability of the environmental natural factors and large investment funds required for their adjustment to planned land-uses, these factors still have the major impact on building sites and architecture. The paper scrutinizes geological environment as the occurrence and development factor of building sites, with emphasize on negative influence of geological environment to building terrains (seismic, geodynamics and hydrological properties) and possibilities for prevention and reduction of negative influence in the geological environment on building sites and sustainability of construction.

Key words: *Mutual interdependence; environmental natural factor – geological environment; building site; significant negative impact; prevention and reduction of negative influence.*

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SMART MANAGEMENT CONCEPT AS A NEW MODEL OF SUSTAINABLE CITY GOVERNANCE

Krešimir Buntak¹²

Abstract

The modern technological environment conditioned by the virtualization and application of Industry 4.0 technology, as well as the increasingly significant demands for sustainable management concepts have led to changes in the way cities are managed. Accordingly, the concepts of sustainable cities are being developed for which it is necessary to establish new ways of management - smart governance. A new management concept that contains all the necessary components to ensure the requirements for efficient and effective management of sustainable and smart cities has been developed as SMART management. The paper describes the concept of SMART management and connects it with the requirements for managing sustainable and smart cities.

Key words: *SMART management, smart City, smart Government, sustainable City*

JEL classification: *H Public Economics; H1 Structure and Scope of Government; H10 General*

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THE IMPACT OF NEW TECHNOLOGIES ON THE DEVELOPMENT AND SECURITY OF COUNTRIES IN TRANSITION

Slavko Vukša¹³; Sergej Vukša¹⁴

Abstract

The instrumentalization of international organizations (UN, EU, OSCE, etc.) is taking place before our eyes. The global power elite and the authoritative world order is enthroned on the principles of hierarchy and domination. That is why we can rightly talk about the invasion of the authoritarian world order on nation-states and the inevitability of limiting sovereignty. Open interference and domination of superpowers over underdeveloped areas, such as NATO aggression on the territory of Serbia under the slogan of "humane interventionism" was enabled. In the preface to the book by communications director John Norris, Strobe Talbott, who led the Pentagon-State Joint Intelligence Committee during the bombing of Serbia, said: "The real purpose of the bombing had nothing to do with caring for Kosovo Albanians. The real cause was that Serbia did not implement market, social and economic reforms, which means that it was the last oasis of Europe that did not obey neoliberal programs under the administration of the USA, so it had to be removed."

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A SCIENCE, TECHNOLOGY AND INNOVATION



TRENDS AND PERSPECTIVES TOWARDS "LEAN INDUSTRY 4.0"

Vlado Radić¹⁵; Nikola Radić¹⁶

Abstract

The ability to produce customized products has become the basis for being competitive in a dynamic, globalized and digitally connected world. Customers are used to receiving products and services specially tailored to their needs. The growing expectations of customers along with the progressing quality requirements have led to a growing number of products in portfolios and indirectly influenced the increase in the complexity of the production environment. The enterprises to be competitive are constantly looking for continuous increase of productivity, quality and level of services. They are also looking for concepts that can reduce complexity in the industrial area, as well as contribute to increasing value and reducing all types of wastes. Two of the most popular concepts used for this purpose are: Lean Management (LM) and Industry 4.0 (I4.0 or I4). The basis of Industry 4.0 is the ability to quickly collect, process, analyze and exchange large data sets between machines. Thanks to modern technologies such as Cyber-Physical Systems (CPS) or Internet of Things (IoT), it is possible to react faster and more flexibly to existing problems, but also to more efficient value creation processes, while reducing costs. With the development of Industry 4.0 concept, manufacturers are more confident about new advantages of automation and systems integration. Lean management is well developed and empirically proven effective managerial approach. Combining Lean and Industry 4.0 practices seems to be necessary evolutionary step for further raise the level of operational excellence. There is an increasing number of Industry 4.0 solutions used to reduce waste (as known from Lean Management). The paper is a comprehensive systematization and rationalization of knowledge about the integration of LM and I4.0 concepts, identifies the most important research trends and defines directions for future research.

Key words: *Industry 4.0; lean management; lean manufacturing; customer expectations.*

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INNOVATION MANAGEMENT IN RURAL ENTERPRISES

Radivoj Prodanović¹⁷; Jovana Gardašević¹⁸; Moamer Softić¹⁹; Radovan Vladisavljević²⁰

Abstract

Neglecting the aspects of introducing and managing innovations can negatively affect the competitiveness of SMEs, and ultimately their survival may be endangered. The aim of this paper is to investigate the way of innovation management and to identify the accompanying problems of domestic rural enterprises. A case study was used, and within it unstructured in-depth interviews, in the case of two small rural enterprises. Successful innovation management includes several separate dimensions, which are interconnected, and relate to the planning of innovative activities, organization, business networking, innovative processes and learning. This means that an innovation strategy is necessary in which the scope and content of innovations are presented. The observed enterprises do not have a clearly defined innovation strategy, but we noticed the presence of innovative components. The success of the innovation process in rural SMEs depends on several factors, the most important of which are: be aware of the importance of innovation, business connections and networking, financial resources, know-how, innovation climate, type of activity, risk aversion, creativity and quality of key people, knowledge and experience and finally the decision to start innovative processes. The organizational chart determines whether there is capacity for innovation and training of employees in the function of encouraging innovation. The main problems are what and how to innovate in low-tech production, which is quite sophisticated, and how to manage innovation in SMEs in the absence of resources and knowledge. It can be said that in domestic rural SMEs, innovation policy is more unconscious than planned activity.

Key words: *Management; innovation; strategy; rural enterprise; SME.*

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EFFICIENCY EVALUATION OF BANKING SECTOR BY USING THE NON-PARAMETRIC DEA METHODOLOGY

Katerina Fotova Čiković²¹

Abstract

This article analyses the application of the non-parametric DEA (data envelopment analysis) in evaluation of the performance and efficiency of commercial banks. Banks are important financial intermediaries of any national economy. The evaluation of banking efficiency and performance is vital, especially in developing bank-based countries with underdeveloped financial systems, due to its strong and positive relationship with financial growth and stability. Banks' efficiency measurement gives insights and valuable information to stakeholders, creditors and policymakers.

The main objective of the research is to provide with an extensive literature review of DEA application in the banking sector and give guidance for future research in this area. Furthermore, the goal of this article is to present and thoroughly elaborate the DEA methodology (its main application, strengths and limitations) and to raise awareness and knowledge of scholars, practitioners and policymakers on how to measure banking efficiency. The author has covered and presented the most cited articles and studies of bank efficiency measurement with DEA application in global terms, ever since DEA's introduction by Charnes, Cooper and Rhodes in 1978.

Key words: *DEA; data envelopment analysis; banking sector; commercial banking; non-parametric method; relative efficiency.*

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THE IMPACT OF TECHNOLOGY IN CORPORATE FINANCE MANAGEMENT

Branka Stipanović²²

Abstract

Technology is a factor that strongly influences corporate financial management as well as the performance of all business processes in corporations. A significant technological breakthrough in corporate financial management has already been made during Industry 3.0, which was shaped by the development of information and communication technology. Technology within Industry 4.0 has a disruptive impact on business as a whole once again, and that process has great implications on corporate financial management. The motivation for research stems from the need to adapt corporate financial management to the conditions that reflect the digital transformation of business and society. The paper presents the impact of Big data analysis and predictive analysis on the decision-making process in the field of corporate financial management.

Key words: *Corporate financial management; Industry 4.0; digital transformation; Big data analysis; predictive analysis; decision making.*

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IVENTION DOES NOT EXIST

*Branko R. Babić*²³

Abstract

Nikola Tesla stated that Invention was the most important product of a man's brain but when the mechanics of the processes involved in invention are scientifically analysed, it becomes obvious that human and indeed animal brains cannot "conjure up", new inventions. This thesis puts forward the concept of assembly of already known facts, into novel constructs, as the process leading to new developments. The paper delves into the detail of the processes and mechanics involved in the development of a new concept and demonstrates that invention does not in practice exist but rather, that new constructs are innovated by copying electro-physical dynamics of already established cortical circuits. The restructuring of retrieved cortical networks into novel constructs is achieved by neuronal processing in the frontal and anterior parietal lobes. Only Discovery and stored information contribute to the development of new methodology. An analysis of the latest research from the "Connectome Project" is applied to demonstrate connectivity of cortical regions and post mortem evidence and clinical surgical procedures involved in cortical resection are used to demonstrate the loss of creative ability in the absence of frontal lobe cortical circuitry.

Key words: *Invention, innovation, cortex, neurons, assembly, memory.*

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B
EDUCATION AND
KNOWLEDGE FOR 21 CENTURY



INNOVATION MANAGEMENT IN HIGHER EDUCATION

Ladin Gostimirović²⁴; Dragan Janjušić²⁵

Abstract

The term innovation management in higher education implies continuous monitoring of innovations and their application in the educational process. This process consists of the following activities: noticing changes, developing the organization, creating innovation and its implementation. This paper is based on the following views:

- Investing in education is an investment that has a longer payback period, but whose effects are manifold and which are multiplied through all areas of society.
- Changes that are taking a rapid trend of acceleration are forcing all market actors to systematically approach their monitoring and reacting to them.
- The imperative of a higher education institution is competitive positioning in the education market by applying continuous innovation in creating a marketing strategy, while providing the expected level of customer service, and at the same time in accordance with the needs of society.
- Managing innovation in higher education should be approached from a strategic level, creating an organizational culture flexible and capable of all kinds of change.
- Application of marketing management based on innovations enables the raising of quality in the higher education system. The promotion of higher education institutions implemented through modern promotional channels significantly contributes to creating a more positive image of the institution, clearly sending a message to the target group that the higher education institution is capable of responding to the challenges of the future.
- Competitive advantage is increasingly based on the realization and monitoring of preferences of service users and their satisfaction through innovation of the teaching process.
- Information technologies provide tremendous opportunities for the improvement of providing services in higher education, breaking down the time and space barriers.

Keywords: *innovation, higher education, competitiveness, promotion, management.*

Thematic field: B

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YOUNG TALENTS IN SCIENCE SYSTEM OF UKRAINE

*Vitaliia Klimenkova*²⁶

Abstract

The article analyzes the results of the research, devoted to the study of the issues of the entry of young scientists (talents) into the scientific system of Ukraine.

In the course of the research, in February-April 2021, a sociological electronic survey was conducted using a Google questionnaire, in which 352 young scientists from three sections, 14 branches and 83 institutes of the National Academy of Sciences of Ukraine took part. Note, that 70.3% of respondents plan to link their lives with science, which indicates the commitment of young professionals to science.

Based on the survey, it can be concluded that young talents are the most active component of human resources: young researchers are better adapted to the implementation of innovative projects and technologies, they are a concentration of fundamentally new knowledge and ideas, mobile and full of creativity. Motivating the most talented employees is one of the main goals of achieving competitiveness and improving the efficiency of the country's economy.

Key words: *young talents, science, electronic survey, human resources.*

JEL classification: O3

Thematic field: B

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PROBLEM SOLVING AS A KEY COMPETENCE IN A MODERN WORLD: HOW TO TEACH IT AND HOW TO EVALUATE IT?

Natalija Ćurković²⁷

Abstract

Education is recognized from UNESCO and OECD as a main driver of countries development. According to the aforementioned organizations, education systems should focus on development of competencies that would enable young people to become life span learners and to adjust to rapid changes in modern societies. One of the key competencies in that context is problem solving. Therefore, one of the main goals of the recent curricular reform in Croatia was increasing student problem solving competency. The aim of this research was to assess level to which the listed goal of the curricular reform was reached. Research was conducted in 74 Croatian primary and secondary schools. The study had mixed-method design: standardized problem solving tests, and interviews with students, teachers and school principals. Tests were online delivered to 6952 students. Quantitative and qualitative analyses showed that teachers need more education in order to facilitate development of students' problem solving competency.

Key words: *problem solving, mixed-methods, curricular reform, assessment, teaching.*

JEL classification: A00

Thematic field: B

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HIGH SCHOOL EDUCATION AND UPBRINGING - REASONS FOR CHANGES AND HOW SHOULD BE REALIZED

Enes Huseinagić²⁸

Abstract

The present concept of secondary education, as it is known, has diverged from the reality of life. That is now almost, without exception, the accepted reality. The present high school, which was conceived as a model in which intellectual and other occupations would be harmonized, had the task of getting the acquisition of knowledge and preparation for work, and to contribute to the reduction of social differences. However, that goal could not be achieved for several reasons. For the desirable development and quality of work in our high school, it is primary that the new interventions are directed so that it becomes flexible in relation to the ongoing processes, just as change should be generated itself. When it comes to the need to harmonize the work of our high school with changes in science, technology and life, this requirement requires a serious attempt. The request to put the school in the function of changes, to get rid of unnecessary, outdated, refers not only to the curriculum, but also to the process of education and upbringing, to the relations between individual tasks of the school (moving the market to natural sciences, on adequate coordination of working of certain factors influencing young people, etc.)

Key words: *Changes in education; education reform; educational programs; labor market.*

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ANGLICISMS AND THEIR ROLE IN THE SPREAD OF ENGLISH AS A GLOBAL LANGUAGE ON EARTH

Slobodanka Đolić²⁹

Abstract

The spread of English as a language of global communication in the world is connected, among other factors, with the global scale of learning this language in the world, regardless of the language of a given people. An Internet that has expanded the network to cover almost the entire globe except for some rare groups of people who still live in the darkness of new developmental communication technologies. It is true that no matter how hard we try to preserve the national language from the influence of other languages, English terms inevitably penetrate it and expand its use, opening new meanings and contexts of use at such a speed that the native language of the speaker is not able to follow such developments and how they cause the basic vocabulary of native speakers to expand. The flood of words from the vocabulary of native English speakers has a huge impact on everyday communication, scientific discussions, business contacts and actions. In general, this flood has affected all spheres of social development and caused dependence without which the overall development of the country lags behind others. According to the time in which we live in the first decades of the 21st century, the question arises: Do Anglicism play a positive or negative role in the development of the language of a nation? Is language as a feature of the nation and the people in the same relationship as scientific thought and technological innovations that are part of the progress of national identity? In the world language market, does English have the greatest value that gives it the power to rule the world by changing the consciousness of people within the civilizational and cultural heritage of behavior? In this article, we will try to present objective facts about the positive status of the English language in the international context and to point out, through examples from the Serbian language, the positive and negative influences of English in the development of the Serbian people and their language.

Key words: *English language; Internet; global communication.*

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THE IMPORTANCE OF TEACHING IDIOMS TO THE STUDENTS OF ECONOMICS AS A WAY OF ACHIEVING COMMUNICATIVE COMPETENCE IN BUSINESS ENGLISH

Nataša Lukić³⁰

Abstract

In any language there are certain expressions, word combinations or phrases that cannot be understood literally, and the lexical meaning of which differs more or less from the meaning of each word considered separately. These word combinations are called phraseological units or idioms and they play an important role in acquiring a certain language, often indicating a proficient learner. Idioms are also part of the cultural elements of the language which should be mastered by EFL learners in order to improve their communicative skills, since being able to use idiomatic expressions when communicating in English is considered a significant part of language proficiency. This paper deals with the importance of teaching idioms to the students of economics, as a way of improving their English language skills and achieving communicative competence in Business English, which will make them able to use language in a socially responsible way. The aim of the paper is to investigate problems and difficulties encountered by the students and possible strategies used to overcome them. It also investigates what types of innovative teaching approaches and methods can be used when teaching Business English idiomatic expressions.

Key words: *Idioms, business English, EFL.*

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MUSIC - A GUIDE TO THE IMAGE AND EMOTIONAL STIMULATION

*Biljana Savić*³¹

Abstract

The music in the film crosses the boundaries of the field of musical art and requires adaptability in perceiving fundamental, interdisciplinary aspects. Music appears in the film as a part of the film's events, as an integral part of the image and the director's concept. Film music, as a special musical genre, fits into the dramaturgical audiovisual whole of the film, becoming an essential element of the film's structure. Film image and music realize their symbiosis in the consciousness of the recipient. how to qualify musical themes that are not archival but refer to originally composed wholes? Does the music in the film have a primarily accompanying dramaturgical role or can it be part of the plot and subject of the film? Is music expected to comment on the action and what role is given to immanent music as opposed to transcendent music? The author will give answers to questions about how music guides the image and emotionally stimulates the recipient, through a case study in the film *Immortal Beloved* directed by Bernard Rose.

Key words: *Musical counterpoint; film music; dramaturgical role of music.*

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DEVELOPMENT AND IMPROVEMENT OF HUMAN RESOURCES

*Petra Ercegovac*³²

Abstract

Human resources are becoming a recognizable form of resources that has led to the realization that people are the most important factor for obtaining the set of goals of the organization. The concept of human resource management is increasingly mentioned as a form of scientific discipline in numerous studies, articles and publications that are more actively focused on the issue of human capital and its improvement. The aim of this paper is to explain the importance of investing in human resources, and to show the complexity of development and improvement of human resources as a complex job that requires more knowledge and skills of managers than needed in leading and organizing other resources of the organization. Because man as a thinking and conscious being requires an individual approach, managers have the task of discovering, developing and mobilizing human resources to realize the goals of the organization, while personal investments of employees must not be frustrations, but personal satisfaction. The analysis of scientific papers on the topic of human resources leads to the realization that the individual approach of managers to the motivational effects of employees, education and improvement of their skills is crucial when mentioning the competitiveness of the organization and economic performance.

Key words: *human resources, human capital, motivation, competitiveness, skills, individual approach*

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C
PRESERVATION AND
IMPROVEMENT OF
ENVIRONMENT AND
HUMAN HEALTH



THE IONIZING RADIATION AROUND US

Marija Šljivoić-Ivanović³³; Ivana Jelić³⁴, Slavko Dimović³⁵;

Abstract

Ionizing radiation and radioactivity are phenomena that people are very afraid of. However, they are naturally present in the environment but also are widely spread in the industry and medicine. This paper aims to explain the main radiation sources of this radiation, its applications, and the ways of radiation protection. Also important are the procedures and rules given with law and bylaws to diminish the radiation exposure of the population and the people who work with the radiation sources. In order to prevent exposure of people to high doses of radiation, it is necessary to control the radioactivity of consumer goods, food, drinking water, etc., monitor the content of radionuclides in the environment, control the correctness of devices containing radiation sources or emit radiation, but also the education of people working with them.

Key words: *ionizing radiation, radioactivity, radiation protection.*

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INFLUENCE ANALASYS OF CEMENT MATRIX CURING TIME ON THE Co^{2+} AND Cs^+ LEACHING LEVEL IN STATIC CONDITION

Slavko Dimović³⁶; Ivana Jelić³⁷; Marija Šljivić-Ivanović³⁸

Abstract

The manuscript observes the Co^{2+} and Cs^+ leaching under static conditions immobilized in cement matrices under conditions of different curing times. Drying and curing times were 28, 60, and 90 days for each matrix separately. The leaching of Co^{2+} and Cs^+ ions depends on the time and cement matrix curing conditions. By extending the curing time, the level of Cs^+ leaching decreases while most of the change takes place up to 60 days. The severity of this effect increases slightly with the increasing porosity of cement matrices. The effect of curing time on Co^{2+} leaching is smaller, and most of the change also takes place up to 60 days. The mechanism of the leaching process of Co^{2+} and Cs^+ is reflected in the dependence of the process itself on cement matrix curing time. In the initial period, expressed in the first 7 days, there is increased leaching of Co^{2+} and Cs^+ . In this period, the leaching level does not depend on the curing time and this phase is called the leaching phase. When the largest part of Co^{2+} and Cs^+ ions is leached from the matrix surface, they migrate along longer paths from the matrix mass through the washed-out surface layer to the leaching solution. This represents the second phase of leaching, controlled by diffusion, dominant over a long period of time. After 28 days of leaching, when more than 70% of the hydration process is complete, the importance of prolonged curing time becomes apparent.

Key words: *Radionuclides; radioactive waste; immobilization; cement.*

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COMPARATIVE ANALYSIS OF METAL CONTENT IN PLANTS OF THE SPECIES PEUCEDANUM

Jelena Bošković³⁹; Jelena Mladenović⁴⁰; Vladica Ristić⁴¹

Abstract

The primary intention of the paper was to point out the general characteristics and the distribution of the Apiaceae family. The distribution and characteristics of two species of the genus *Peucedanum* L. (*Peucedanum officinale* L. and *P. oreoselinum* L.) are also presented. Material as well as their concentration in the root and plant organs. The bioaccumulation coefficient, bioconcentration and translocation factor for all tested metals were determined. The values of the obtained elements can be compared as: Fe > Ca > Mg > Mn > Zn > Cu > Ni. The results show that the distribution of the examined elements in the species *Peucedanum officinale* L. is as follows: there is Ni in the root; There is Mg in the fruit; The leaves have the most Ca, Mn, Fe, Zn, while the inflorescences have Cu. In *P. oreoselinum* L.: at the root Ni, Zn; In the inflorescence Cu and in the leaf it has the most Ca, Mg, Fe, Mn. Based on translocation factors, all metals translocate well from the root to the aboveground parts of the tested plants, with the exception of Ni and Zn in the plant *P. oreoselinum* L., and Ni in *P. officinale* L.

Key words: *Peucedanum; metals; distribution.*

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PROPOSAL OF THE NEW NOMENCLATURE IN PLANNING FOR ADAPTATION TO CLIMATE CHANGE AT THE LEVEL OF LOCAL SELF-GOVERNMENT UNITS (LSGU) IN SERBIA

Marina Nenković-Riznić⁴²; Mila Pucar⁴³; Borjan Brankov⁴⁴

Abstract

The impact of climate change on the implementation of different activities in Serbia is evident. The new living conditions impose a change in the existing paradigm of spatial planning and management. In addition to numerous initiatives for the adoption of strategic and legislative acts at the national level, it is necessary to simultaneously define an adequate system of horizontal and vertical planning. It would include the development of action plans for climate change adaptation at the local level, adoption of instructions, guidelines, manuals for local government and population. Taking into account all national documents in the field of climate change and reduction of CO₂ emissions (already adopted or in the process of adoption), this paper will propose a new nomenclature in planning for adaptation to climate change at the local level in Serbia. This would simplify the procedure for local governments to adequately respond to all risks arising from the growing consequences of climate change and enable an adequate response.

Key words: *Climate change; planning; new nomenclature; LSGU Serbia.*

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APPLICATION OF BIOTECHNOLOGY IN AGRICULTURE

Jelena Bošković⁴⁵; Vladica Ristić⁴⁶; Tanja Kvesić⁴⁷

Abstract

Application biotechnologies are considered genetic engineering in agriculture with the introduction of genetically modified (GM) plants are constantly creating new opportunities to increase crop production and to solve problems in agriculture, such as diseases, pests, weeds, abiotic stresses and nutritional limitations. These are formed, and the plants having new properties that enable their use in pharmaceutical manufacturing. As the GM plant introductions to various locations characterized by a variety of ecosystems, types of agriculture, biodiversity and agriculturally practice, it is necessary to scientific understanding of the effects of growing GM plants on the environment, which will provide security and environmental sustainability. The most important research she focused on the invasiveness of the GM plant, vertical and horizontal gene transfer, the impact on biological diversity and on other products. These tests are very complex multi, inter and transdisciplinary. This article discusses some of the most important problems related to the application of the technology of genetic engineering in agriculture and the introduction of GM plants into the environment, such as plant protection, ecological effects of horizontal gene transfer, biodiversity, stress, the effects of land etc. There is a clear need to further investigate the size and scope of the risk spreading of transgenic plants. In assessing the interrelation of GM plants and existing varieties, more detailed knowledge of the development of GM plants will provide a clearer, more reliable and precise directed activity in plant sciences.

Key words: *Genetic engineering; crop production; GM plants; biotechnology.*

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DOES A MORE GENEROUS QUARRY REHABILITATION YIELD RICHER BIODIVERSITY?

Vaja Pavlović⁴⁸

Abstract

We study the efficiency of different quarry rehabilitation techniques by qualifying the action on biodiversity in monetary terms and by measuring the reaction of biodiversity to this action through the appropriate indicators. We developed the Biodiversity by Investment method (BBI), which consists in evaluating the investment in quarry rehabilitation, in relation to biodiversity developed in reaction to this rehabilitation: the cost is crossed with values of the biodiversity indicators – species number, Shannon and Simpson index, based on 10m² botanical plots. We show that the same results for biodiversity can be achieved with considerably less expensive rehabilitation techniques. The most expensive rehabilitations can be avoided without consequences for biodiversity. We suggest that quarry operators favour rehabilitation techniques that will promote development of biodiversity on site, rather than demonstrating their commitment to biodiversity by the amounts of money invested in these rehabilitations.

Key words: *Biodiversity; mining; quarry; rehabilitation; cost.*

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ENVIRONMENTAL RISKS OF MODERN SOCIETY

Slobodan Milić⁴⁹

Abstract

In this paper, the author deals with environmental risks from the sociological aspect, which, along with political and economic risks, represent the greatest danger of modern society. Modern society embodied in neoliberalism represents its paradigm, carries with it certain risks, which seem to be hard to deal with it. Many experts and movements whose activities are closely related to environmental protection warn of possible consequences if something is not done about this issue. On the other hand, multinational corporations, advocates of neoliberalism, are not overly troubled by the fact that the environment is in danger as they actively continue to annihilate nature. It is clear there is a profit behind everything. However, the human factor also bears a great responsibility because its (un)conscious action significantly contributes to the ecocide. By destroying natural resources for profit and our irresponsibility, we are endangering the planet Earth and the survival of the human race. Man is a being who must live with nature and not against it.

Key words: *Environmental risk; modern society; environment; neoliberalism.*

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THE ROLE OF CORPORATE SOCIAL RESPONSIBILITY IN DEVELOPING ENVIRONMENTAL AWARENESS AND CHANGING CONSUMER BEHAVIOR

Marina Guzovski⁵⁰

Abstract

The social responsibility of the company as well as the social responsibility of each individual is in undertaking activities that will protect and improve the welfare of society as a whole, their responsible behavior to protect the environment while meeting their own interests and needs. The task of marketing in this context is to raise awareness, increase interest, education, information as well as the impact on voluntary behavior change by consumers and members of society. The paper presents and analyzes the results of research on the impact of socially responsible business of individual companies and the application of socially responsible marketing on changing consumer habits, their environmental awareness, and adoption of good habits and the process of making a purchase decision.

Key words: *Socially responsible business; socially responsible marketing; environmental awareness; green marketing; consumer behavior.*

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PERCEPTIONS AND ATTITUDES ON ORNAMENTAL FEATURES AND THE USE OF SELECTED ROSE CULTIVARS

Boris Dorbić⁵¹; Marija Tarle⁵²; Željko Španjol⁵³

Abstract

Roses are counted as one of the most beautiful and the most beloved plants with large number of cultivars. The hybrid Tea-Roses that are selected as the subject of this research are used for pruning and they are widespread on the landscape. Floribunda, as the second studied group are branched, containing more flowers in the bouquet and they are lower in growth than the Tea-Roses. With the use of a survey questionnaire, the goal of the research was to investigate the perception and attitudes of respondents on ornamental characteristics, and also on the application of the selected rose cultivars (the hybrid Tea-Roses and Floribunda Roses).

Results have shown that the respondents in terms of ornamental characteristics have assigned the highest scores to the rose cultivar Alec's Red (4,54), and that they only slightly more favoured Floribunda than Tea-Roses. With the preferences of colours of offered cultivars, the respondents mostly preferred warm, red tones colours. With the regards of the attractiveness of roses in the garden and in public landscapes, the average scores divided by the groups are nearly equal, while for the attractiveness of a pink pruning cultivar Pink Parfait was awarded with the best scores. For the purpose of cultivation and care with regards to the both of the groups, the respondents perceived them as moderately difficult.

Key words: *perceptions, attitudes, cultivars, roses, ornamental characteristics, use.*

Thematic field: C

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DECISION-MAKING ANALYSIS IN FORMING AN INVESTMENT PLAN FROM THE ASPECT OF WORKER AND POPULATION HEALTH SAFETY

Aleksandra Kovačević⁵⁴

Abstract

Population health is one of the most important segments of the social community. Only a healthy population can be part of a healthy collective. Investing in your employees in the future will be part of every investment plan. Given that injuries are increasingly occurring in the workplace, it is necessary to reduce them to a minimum and thus create a healthy business environment. It is necessary to perform a risk analysis as well as an analysis of the number of injuries that occurred in a certain period of time. Additional employee training needs to be conducted continuously.

Key words: employee safety, decision analysis, efficiency, knowledge, human resources, planning

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WATER PROTECTION AS A CONDITION FOR PRESERVATION AND IMPROVEMENT OF THE ENVIRONMENT AND POPULATION HEALTH

Vanda Božić⁵⁵; Dragan Bataveljić⁵⁶

Abstract

Protection and use of water as a good of general interest, use and management of water, conditions and manner of performing water management activities, organization and financing of water management activities are regulated by legal regulations. In the paper, the authors give a comparative overview of water protection in Croatia and Serbia and point out possible improvements in their protection and preservation. Water can be used in a way that does not endanger the natural properties of water, does not endanger human life and health, does not endanger flora and fauna, natural values and immovable cultural property. The water of natural watercourses, natural lakes, natural springs, public wells and public fountains can be used by everyone, under equal conditions to meet the needs of life. Water must be used rationally and economically, and the use of water to supply the population with drinking water, sanitary needs and watering livestock takes precedence over the use of water for other purposes. Protection of waters from pollution is carried out in order to enable their harmless and undisturbed use, protection of human health, fauna and flora and environmental protection. Protection is implemented by prohibiting, restricting and preventing the introduction of hazardous and harmful substances into water, prescribing and taking other measures to preserve and improve water quality. During the XX century, due to the rapid technological development, there was a great pollution of water resources, which increased the demand for these natural resources. That is why, so far, from the middle of the last century until today, over 500 local wars have been fought in the world to provide this resource. The century in which we live will only show how important water is for preserving the health of the population and national security.

Key words: *water, health and environmental protection, legal regulations, national security, water management facilities, water regime.*

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D
GOVERNANCE AND
SUSTAINABLE TERRITORIAL
DEVELOPMENT



PLANNING SYSTEM FOR SUSTAINABLE TERRITORIAL DEVELOPMENT IN SERBIA

Marija Maksin⁵⁷; Vladica Ristić⁵⁸

Abstract

The aim of this article is to research the problems in the development and practices of the planning system in the sustainable territorial development of Serbia. Research is based upon the analysis and assessment of how integrated and supported is the legal framework, governance system and planning system (spatial, environmental and sector planning) in the sustainable territorial development of Serbia. The paper also analyzes the role and possibilities for the implementation of strategic environmental assessment as a support instrument (control and coordination) of strategic planning. The main findings are that in Serbia there are many cases of hastened, uncoordinated and uncritical adoption of numerous laws and planning documents based on legal heritage and EU development documents, without real reforms of the planning and management system, and without adequate political will to provide mechanisms for the implementation of sustainable territorial development. Recommendations have been given in this article, and priorities singled out for improving the system of statutory planning and facilitating support for sustainable territorial development the Republic of Serbia.

Key words: *Sustainable territorial development; spatial planning; sector planning; strategic environmental assessment; coordination and integration, Republic of Serbia.*

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THE REGIONAL INDUSTRIAL POLICY AND TERRITORIAL DEVELOPMENT

Slavka Zeković⁵⁹

Abstract

The paper examines the post-socialist industrial development, industrial policy (IP), regional specialization and spatial distribution in the part of South-Eastern Europe, i.e. in so-called "Western Balkans" (SEE-WB), and, especially in Serbia. The research includes an overview of the theoretical basis of industrial policy, as well as the European RIS framework, which is also prescribed for the countries joining the EU (in order to make the Smart Specialization Strategy). A comparative ex-post analysis of industrial development and spatial distribution in the SEE-WB is based on quantitative exploration. The results of a comparative analysis of industrial concentration and regional specialization in the analyzed period highlight the weak regional diversification of industrial activity. Despite the predictions that political and economic integration will lead to an increase in regional industrial specialization, the quantitative results show the opposite trend in the SEE-WB, as well as an absence of regional integration in terms of specialization and spetialization. Also, the paper explores the industrial development and strategic perspectives of the new Serbian IP and territorial development. The new IP can cause different impacts on the territorial development, planning and governance. Some recommendations for improving the IP and reducing spatial inequalities in the SEE-WB would be given.

Key words: *Industrial policy; regional specialization; spatial concentration; Smart Specialization Strategy; South-eastern Europe; Serbia.*

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NEW METHODOLOGY IN GREEN CITY PLANNING - THE WAY TOWARDS SUSTAINABLE URBAN DEVELOPMENT

*Mila Pucar*⁶⁰; *Sanja Simonović-Alfirević*⁶¹, *Marina Nenković-Riznić*⁶²; *Snežana Petrović*⁶³

Abstract

The city of Belgrade in 2018 has signed Covenant of Mayors on climate and energy in order to reduce carbon dioxide (CO₂) emissions by at least 40% and to increase the city's resilience to the effects of climate change by 2030. In order to implement these goals, a team (authors of this paper) was formed to develop a Sustainable Energy and Climate Action Plan (SECAP) based on the results of the Baseline Emission Inventory (BEI) and Vulnerability and Risk Assessment (VRA). VRA has involved determining CO₂ emissions using a series of activity-based approach and reducing GHG emissions. The impact of the given measures on climate change mitigation, was assessed on the basis of a hypothetical baseline scenario (increase in demand in the BEI sectors and socio-economic parameters). In order to achieve that, it is necessary to implement projects in the field of energy efficiency, expand district heating, introduce renewable energy sources in the energy potential of the city, rationalize public lighting and traffic, and continue with intensive greening of the city.

Key words: *Integrated baseline emission inventory (BEI); vulnerability and risk assessment (VRA); climate change mitigation and adaptation; energy and energy efficiency.*

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INTEGRATION OF THE CONCEPT OF SUSTAINABILITY IN the ANALYSIS OF ENVIRONMENTAL IMPACTS AND PROJECT PREPARATION FOR TRANSPORT INFRASTRUCTURE

Igor Jokanović⁶⁴; Milica Pavić⁶⁵

Abstract

The process of environmental impact analysis and sustainability planning are usually two different tasks. Both processes bring similar benefits because they ultimately help transport infrastructure to reduce its impact on the environment, society and the economy, whether it is the general operation of the network or through individual elements. Although the sustainability of the transport network or a specific part of it is not specifically required, integration would enhance sustainability efforts and ensure that projects reflect a balanced approach. The paper aims to present some basic elements of integration through individual phases of preparation of transport infrastructure projects. In that way, the use of materials, components and procedures for performing works is ensured, which will provide the infrastructure and enable the appropriate transport service in accordance with the set goals of sustainable development.

Key words: *Transport infrastructure; sustainability; integration; engineering behavior.*

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SPATIAL AND TRANSPORTATION DEVELOPMENT OF BIG BULGARIAN CITIES - THE CASE OF PLOVDIV AND VARNA

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Abstract

The spatial development of the Bulgarian cities Plovdiv and Varna, their form and their transportation systems are geographically and historically determined. Plovdiv have built on the development of old settlement located on the shores of Maritsa river, with the presence of important roads passing through. While the development of Varna is strongly related to the characteristics of Black Sea shores. During their development, for a variety of reasons, cities have changed their shape and size, and also their street network and spatial structure type. Over the years, the modes of transport and the transport systems required for this have also undergone changes, and in the last century their influence on the urban form has been tangible. In this article, the authors attempts to present the timeline of these interrelated changes through a graphical analysis of urban plans of two of the largest Bulgarian cities – Plovdiv and Varna.

Key words: *Spatial development; transportation systems; history; evolution; urban plans.*

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E
NATIONAL SECURITY AND
PROTECTION



LEGAL, ECONOMIC AND SECURITY ASPECTS OF THE EUROPEAN UNION IMMIGRATION POLICY

Mirko Smoljić⁶⁸

Abstract

The common asylum policy, including the common European asylum system, is an integral part of the European Union's objective of progressively creating an area of freedom, security and justice, open to those who have been forced by circumstances to seek international protection in the Union.

A system called "Eurodac" has been set up to assist in determining which Member State is based on Regulation (EU) No 182/2011. 604/2013, responsible for examining an application for international protection lodged in a Member State by a third-country national or a stateless person.

The migration crisis has entered a phase where most migrants have changed their minds due to the dangers and measures as well as the prevalence of the coronavirus pandemic and are no longer going to European Union destinations. Migrants have been hit by a double crisis, a crisis caused by a coronavirus pandemic and a stalemate in migrant movements, which has recently reduced the pressure of migration to EU countries, but also forced countries with large groups of migrants to take a new approach to asylum policy. migrants' rights to international protection. This paper refers to immigration policy in the European Union and especially in the Republic of Croatia with statistical indicators, and especially to the new Pact on Migration and Asylum of the European Union.

Key words: *migration, asylum politics, Republic of Croatia, New Pact on Migration and Asylum of the European Union.*

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THE PROBLEMS OF NATIONAL SECURITY AND GLOBALIZATION – VIEW FROM SERBIA

Mina Zirojević⁶⁹

Dragan Paunović⁷⁰

Abstract

When we thought about globalization a few decades ago, we thought only of good things: exchange of experiences, information, economic processes, close cooperation. Later, we only thought about the problems that globalization brought us. Today, many decades later, with the problems of migration, climate change, security risks, we are already mature enough to rationally gather impressions.

In this essay we will try to examine national security strategies of four categories of states (major powers, states in stable regions, states in region of enduring rivalries and weak states) and compare influence of major states to other three categories.

Although our initial premise was that globalization has greatly influenced the disintegration of the traditional understanding of babysitting, after analysis and comparison, we saw that the traditional defense system was maintained and that globalization had an unequal effect on aspects of security threats.

Key words: *globalization, security, major powers, Serbia*

JEL classification: K33

Thematic field: E

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TERRORISM AS A GLOBAL PHENOMENON AND ITS FINANCING

*Olgica Vulević*⁷¹

Abstract

Terrorism is one of the most serious threats to the security of modern society on a global and national level. In the process of globalization, even states can no longer allow themselves to focus on the only issue of their national security. Societies from countries in transition are witnessing an ever-expanding "threat": while there are expectations that the state will protect its citizens, they increasingly hold the state responsible for terrorist attacks. Today's terrorist organizations and their activities are in most cases financed by funds of illegal origin, which often resulted from illegal activities. In addition, they are financed to a lesser extent with funds whose origin is legal - terrorism is "paid for and sponsored" by legal entities (states, non-governmental organizations, multinational companies, wealthy individuals, etc.). The historical, legal method and the comparative method were used in the paper.

Key words: *Terrorism; terrorist financing; money laundering; national and global security.*

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TAX AND ACCOUNTING CHALLENGES OF VIRTUAL CURRENCY REGULATION

Tajana Petrović⁷²

Abstract

The development of the digital economy has influenced the use of the virtual world economy and virtual currencies as an alternative capital market and created the possibility of capital outflows from traditional capital markets to cryptocurrency markets. As virtual currencies gain more and more importance in the world economy and become a common occurrence in modern business, there is a need to adopt a suitable legislative solution. Due to the specificity and diversity that arise from its characteristics, they represent a great challenge for regulation and supervision.

Although they are treated differently by the tax authorities of countries worldwide, existing taxation systems can service virtual currency taxation without new legislation. However, it is crucial to adopt comprehensive guidelines as a model for taxing virtual currency transactions within existing rules. On the other hand, doing business with virtual currencies in accounting is still very challenging because of financial reporting due to the recognition and recording of transactions of such currencies within the framework of existing international standards.

Key words: *virtual currency, tax, accounting, risk, anonymity, cryptocurrencies.*

JEL classification: K34, M41, K24

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JUVENILE OFFENDERS FROM THE PERSPECTIVE OF CRIMINAL LAW AND CRIMINOLOGY

*Nenad Bingulac*⁷³

Abstract

Juvenile offender in the positive law of the Republic of Serbia is offender who at the time of the offense had reached the age of 14 but has not reached the age of 18, a criminal act is done as: perpetrator, accomplice, instigator or accomplice. This research will have two essential parts. In the first part it will be considered and pointed out the theoretical considerations observed from the angle of criminal law and then from the criminological angle. A special focus of this part of the research will be on indicating the penal policy towards juveniles. In that sense, we point out that juveniles may be sentenced for criminal offenses in accordance with a special law (*lex specialis*). The second part of the research will focus on current statistics related to juvenile offenders. Within this part, special attention will be paid to the presence of certain criminal acts in their commission. Due to the prominent goal of this research through the methodological and theoretical framework of juvenile offenders. By using the method of analysis we will address the most important issues of relevance to research using current statistics, while the normative method will be used to illustrate legislation regulating the study of matter in the positive legislation of the Republic of Serbia. At the end of the paper, the conclusions drawn from the overall research will be outlined.

Key words: *Juvenile offenders; criminal law; criminology aspects; security challenge.*

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OBLIGATION OF DATA MANAGEMENT WITHIN HUMAN RESOURCES MANAGEMENT IN CROATIA

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Abstract

The paper is based on the importance of a unique and well-organized database of employees that every business organization should have in order to survive in today's changing market. In this regard, a research question was asked to what extent data management of employees is legally binding in Croatia. In order to obtain an answer to this question, a secondary research and analysis of legal acts that conduct the obligations of business organizations to record data on employees was performed. The paper discusses the Policy of content and manner of keeping records of employees, especially the records of employees and records of working hours, and all above within the General Regulation on Personal Data Protection.

Key words: *Information systems in HRM, employee database, legal regulations of keeping records of employees, registration of employee.*

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