

Međunarodni tematski zbornik
PRIMENJENA ISTRAŽIVANJA

International thematic proceedings
APPLIED RESEARCHES

Međunarodni tematski zbornik
PRIMENJENA ISTRAŽIVANJA

Izdavač

Institut za srpsku kulturu Priština – Leposavić

Suizdavači

**Međunarodno udruženje metodologa društvenih nauka, Beograd
Univerzitet „MB“ Beograd**

Za izdavača

**Prof. dr Dragan Tančić, direktor
Akademik, prof. dr Neđo Danilović, predsednik
Prof. dr Milija Bogavac, osnivač i vlasnik**

Uredili i priredili

**Akademik, prof. dr Neđo Danilović
Univerzitet „MB“ Beograd**

**Prof. dr Dragan Tančić
Institut za srpsku kulturu Priština – Leposavić**

Recenzenti

**Akademik prof. dr Dževad Termiz
Univezitet u Sarajevu, Fakultet političkih nauka, Sarajevo, Bosna i Hercegovina**

Prof. dr Ivan Radosavljević

Podpredsednik Nacionalnog saveta za visoko obrazovanje, Beogradu, Republika Srbija

Prof. dr Aleksandar Halmi

Sveučilište u Zadru, Odjel za turizam i komunikacijske znanosti, Zadar, Republika Hrvatska

Lektura i korektura

Jelena Vojinović Kostić

Tehnička priprema i grafičko oblikovanje teksta

Miodrag Panić

Štampa

GID „Pi-press“, Pirot

Tiraž

150

ISBN 978-86-89025-57-6

Objavljivaljnje ovog Zbornika pomogli su finansijski i organizaciono Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije, Srpska akademija nauka i umetnosti, Institut za Srpsku kulturu iz Prištine – Leposavić.

International thematic proceedings
APPLIED RESEARCHES

Publisher

Institut for Serbian Culture Pristina – Leposavic

Co-publisher

**International Association of Social Science Methodologists, Belgrade
University "MB" Belgrade**

For the publisher

Academician Professor Nedjo Danilovic, PhD, president

Professor Dragan Tancic, PhD, director

Professor Milija Bogavac, PhD, founder and owner

Edited and prepared by

Academician, Professor Nedjo Danilovic, PhD

University "MB" Belgrade

Professor Dragan Tancic, PhD

Institute for Serbian Culture in Pristina – Leposavic

Reviewers

Academician professor Dževad Termiz, PhD

University of Sarajevo, Faculty of Political Sciences, Sarajevo, Bosnia and Hercegovina

Professor Ivan Radosavljevic, PhD

Vice President of the National Council for Higher Education, Belgrade, Republic of Serbia

Professor Alexander Halmi, PhD

University of Zadar, Department for Tourism and Communication Sciences, Zadar, Croatia

Proofreading

Jelena Vojinović Kostić

Technical preparation and graphic design of the text

Miodrag Panić

The press

GID „Pi-press“, Pirot

Circulation

150

ISBN 978-86-89025-57-6

The publication of this proceedings was helped financially and organizationally by the Ministry of Education, Science and Technological Development of the Republic of The Serbia, Institute for Serbian Culture from Pristina - Leposavic.



ИНСТИТУТ ЗА СРПСКУ КУЛТУРУ ПРИШТИНА – ЛЕПОСАВИЋ
INSTITUTE FOR SERBIAN CULTURE PRISHTINA – LEPOSAVIC



Institut za srpsku kulturu Priština – Leposavić
The Institute for Serbian Culture Pristina – Leposavić

Međunarodno udruženje metodologa društvenih nauka, Beograd
International Association of Methodologists of Social Sciences, Belgrade

Univerzitet „MB“ Beograd
University “MB” Belgrade

Međunarodni tematski zbornik
PRIMENJENA ISTRAŽIVANJA

International thematic proceedings
APPLIED RESEARCHES

Leposavić
2021.

*Uspomena na profesora dr Ivana Radosavljevića (1950–2020),
osnivača i prvog predsednika Međunarodnog udruženja
metodologa društvenih nauka*

*Memories of Professor Ivan Radosavljević, PhD (1950–2020),
founder and first president of the International Association
methodologist of social sciences*

SADRŽAJ

PREDGOVOR	17
UVOD	25
Academik prof. dr Neđo S. Danilović Prof. dr Milija Bogavac Prof. dr Dragan Tančić, naučni saradnik Uvodno pregledno predavanje: ANALIZA GLOBALNOG STANJA NA POLJU ISTRAŽIVANJA I RAZVOJA SA OSVRTOM NA PRIMENJENO ISTRAŽIVANJE	29
Academik prof. dr Dževad Termiz Academik prof. dr Nedeljko Stanković Academik prof. dr Wolfgang Rohrbach METODOLOŠKI PROBLEMI NAUČNO-TEORIJSKOG ISTRAŽIVANJA	47
Prof. dr Aleksandar Halmi AKCIJSKA ISTRAŽIVANJA KVALITETA ŽIVOTA OSOBA S RAZLIČITIM DUŠEVNIM POREMEĆAJIMA U REPUBLICI HRVATSKOJ – REZULTATI LONGITUDINALNOG ISTRAŽIVANJA ...	59
Проф. др. Владимир Солтанович Джатиев УГОЛОВНАЯ ОТВЕТСТВЕННОСТЬ: МЕТОДОЛОГИЯ, ЗАКОН, ПРАКТИКА	73
Prof. dr Milosav Milosavljević PREDNOSTI I OGRANIČENJA AKCIONIH ISTRAŽIVANJA	87
Prof. dr Venelin Terziev Prof. dr Margarita Bogdanova NOVI POSLOVNI MODEL UNIVERZITETA	99
Prof. dr Siniša Zarić Doc. dr Rosana Pikolo ULOGA I ZNAČAJ PSIHOLOGIJE I SOCIOLOGIJE U EKONOMIJI: BEHAVIORALNE EKONOMIJE	111

- Prof. dr Milan I. Miljević
 OTVORENA TEORIJSKO-METODOLOŠKA PITANJA
 U ISTRAŽIVANJU SOCIJABILITETA 123
- Prof. dr Marko P. Atlagić
 MA Filip M. Obradović, istraživač saradnik
 MA Petar D. Tančić
 KOMPARATIVNI REZULTATI ANALIZE I SINTEZE
 HERALDIČKIH IZVORA O GRBU REPUBLIKE HRVATSKE 139
- Dr Srđan Slović, naučni savetnik
 Prof. dr Dejan Mihailović
 OSOBENOST ISTRAŽIVANJA U NAUCI
 O MEĐUNARODNIM ODNOSIMA:
 ISTORIJSKO-SOCIOLOŠKI PRISTUP 157
- Prof. dr Miodrag Gordić
 Docent dr Ivan Petrović
 MA Jovan Gordić
 MODELOVANJE IZBORA BORBENOG HELIKOPTERA
 PRIMENOM METODA VIŠEKRITERIJUMSKOG ODLUČIVANJA 173
- Prof. dr Srđan M. Milašinović
 Asistent Sanela D. Andrić, MA
 PROBLEM ISTRAŽIVANJA U DRUŠTVENIM NAUKAMA:
 KVANTITET NA UŠTRB KVALITETA I MESTO
 METODOLOGIJE U KONCIPIRANJU ISTRAŽIVANJA 187
- Др Ивана Ивановић, виш соработник за истражување
 ОПШТЕСТВЕН ФЕНОМЕН – КОРУПЦИЈА 197
- Docent dr Srđan Starčević
 Prof. dr Srđan Blagojević
 ZNAČAJ PRIMENE SOCIOLOŠKOG METODA
 U PRIMENJENIM ISTRAŽIVANJIMA 209
- Docent dr Dragan Pamučar
 Docent dr Vesko Lukovac
 VIŠEKRITERIJUMSKA OPTIMIZACIJA LOGISTIČKIH
 PROCESA PRIMENOM FUCOM-SWOT MODELA 219
- Prof. emeritus dr Momčilo Sakan
 ISKUSTVA IZ PROJEKTOVANJA PRIMENJENIH
 ISTRAŽIVANJA 229

Dr Ana Stišović Milovanović, naučni saradnik APLIKATIVNO ISTRAŽIVANJE KNJIŽEVNOG FENOMENA (na primeru prosvetiteljskih ideja u srpskoj književnosti)	249
Prof. dr Vlado Radić Asistent doktorand MA Nikola Radić ZNAČAJ PRIMENJENIH ISTRAŽIVANJA NOVIH TEHNOLOGIJA I KONCEPTA INDUSTRIJA 4.0	259
Docent dr Milivoje Pajović PRACENJE NAUČNIH I DRUŠTVENIH EFEKATA ISTRAŽIVANJA PRIMENOM METODE ANALIZE SADRŽAJA DOKUMENATA	279
Dr Ermin H. Kuka Prof. dr Emir Tahirović PRIMJENJENA ISTRAŽIVANJA U ANALIZI JAVNIH POLITIKA	291
Docent dr Vesko Lukovac Docent dr Nenad Teodorović Docent dr Dragan Pamučar PRISTUP OCENI ORGANIZOVANOSTI POSLOVA U OKVIRU PROCESA TRANSPORTA LAKOKVARLJIVE ROBE PRIMENOM METODE PROCESNIH FUNKCIJA	309
MA Slaviša N. Arsić Prof. dr Mitar Kovač ZNAČAJ APLIKATIVNIH ISTRAŽIVANJA U RAZVOJU KONCEPTA PREHRAMBENOG SUVERENITETA DRŽAVE	319
Dipl. psiholog Jelena Petrović PROBLEMI PRIMIJENJENIH ISTRAŽIVANJA U PSIHOLOGIJI SPORTA	327
MA Bojan Kuzmanović Docent dr Miroslav Terzić ZNAČAJ PRIMENJENIH ISTRAŽIVANJA ZA RAZVOJ PRAKSE OBAVEŠTAJNOG OBEZBEĐENJA VOJSKE	345
MA Nenad Galjak Docent dr Slaviša Tatomirović UPOTREBA GEOINFORMACIONIH SISTEMA U APLIKATIVNIM ISTRAŽIVANJIMA KROZ PRIMER KARTOGRAFSKOG MODELIRANJA DEMOGRAFSKIH PROMENA NA TERITORIJI GRADA KRAGUJEVCA	359

Asistent MA Zoran Karavidić	
PRIMENA METODE MODELOVANJA U PROCESU OPERATIVNOG PLANIRANJA ZA POTREBE VOJNE DELATNOSTI	379
MA Milan Kovačević	
MA Dejan Nikolić	
ZNAČAJ PRIMENJENIH ISTRAŽIVANJA U PROCESU IDENTIFIKACIJE BITNIH ČINILACA MOTIVACIJE ZA RAD PROFESIONALNIH PRIPADNIKA VOJSKE SRBIJE	389
MA Željko Jokić	
PRIMENJENA ISTRAŽIVANJA U FUNKCIJI RAZVOJA KONCEPTA TOTALNE ODBRANE	403
Prof. dr Olja Arsenijević	
Prof. dr Viktorija Nikolaevna Ryapukhina	
Prof. dr Polona ŠPRAJC	
KVALITATIVNA ISTRAŽIVANJA U ORGANIZACIONIM NAUKAMA	417

CONTENT

FOREWORD	21
INTRODUCTION	27
Academic professor Nedjo S. Danilović, PhD Professor Milija Bogavac, PhD Professor Dragan Tančić, PhD, research associate Introductory overview: GLOBAL ANALYSIS OF THE SITUATION IN THE FIELD OF RESEARCH AND DEVELOPMENT, FOCUSED ON APPLIED RESEARCH	29
Academic professor Dževad Termiz, PhD Academic professor Nedeljko Stanković, PhD Academic professor Wolfgang Rohrbach, PhD METHODOLOGICAL ISSUES OF SCIENTIFIC – THEORETHICAL RESEARCH	47
Professor Aleksandar Halmi, PhD ACTION RESEARCH OF LIFE QUALITY OF PERSONS WITH MENTAL DISORDERS IN THE REPUBLIC OF CROATIA	59
Professor Vladimir Soltanovich Dzhatiev, PhD CRIMINAL LIABILITY: METHODOLOGY, LAW, PRACTICE	73
Professor Milosav Milosavljević, PhD THE ADVANTAGES AND LIMITS OF ACTION RESEARCH	87
Professor Venelin Terziev, PhD Professor Margarita Bogdanova, PhD THE NEW BUSINESS MODEL OF THE UNIVERSITIES	99
Professor Sinisa Zarić, PhD Assistant Professor Rossana Piccolo, PhD THE ROLE AND IMPORTANCE OF PSYCHOLOGY AND SOCIOLOGY IN THE ECONOMICS: THE RISE OF BEHAVIORAL ECONOMICS	111

- Professor Milan I. Miljević, PhD
 OPEN THEORETICAL-METHODOLOGICAL AND
 PRACTICAL ISSUES IN RESEARCH OF SOCIOBILITY 123
- Professor Marko P. Atlagić, PhD
 Filip M. Obradović, MA, research assistant
 Petar D. Tančić, MA
 COMPARATIVE RESULTS OF ANALYSIS AND SYNTHESIS
 OF HERALDIC SOURCES ABOUT THE COAT OF ARMS
 OF THE REPUBLIC OF CROATIA 139
- Srđan Slović, PhD, principal research fellow
 Dejan Mihailović, PhD
 CHARACTERISTICS OF THE RESEARCH STUDY
 IN THE SCIENCE OF INTERNATIONAL RELATIONS:
 HISTORICAL-SOCIOLOGICAL APPROACH 157
- Professor Miodrag Gordić, PhD
 Assistant Professor Ivan Petrović, PhD
 Jovan Gordić, MA
 MODELING THE CHOICE OF A COMBAT
 HELICOPTER BY APPLYING THE MULTICRITERIA
 DECISION-MAKING METHODS 173
- Professor Srđan M. Milašinović, PhD
 Assistant professor Sanela D. Andrić, MA
 THE PROBLEM OF RESEARCH IN THE SOCIAL
 SCIENCES: QUANTITY BEFORE QUALITY
 AND THE PLACE OF METHODOLOGY IN
 CONCEPTUALISATION OF RESEARCH 187
- Ivana Ivanovic, PhD, senior research fellow
 THE GENERAL PHENOMENON OF CORRUPTION 197
- Assistant Professor Srđan Starčević, PhD
 Associate Professor Srđan Blagojević, PhD
 THE IMPORTANCE OF THE APPLICATION
 OF THE SOCIOLOGICAL METHOD IN APPLIED
 RESEARCH 209
- Assistant Professor Dragan Pamučar, PhD
 Assistant Professor Vesko Lukovac, PhD
 MULTICRITERIA OPTIMIZATION OF LOGISTICS
 PROCESSES USING THE FUCOM - SWOT MODEL 219

Professor emeritus Momcilo Sakan, PhD PROBLEMS OF PROJECTING APPLIED RESEARCH	229
Ana Stišović Milovanović, PhD, research associate APPLIED RESEARCH OF LITERARY PHENOMENS (On The Example of The Enlightenment Ideas in Serbian Literature)	249
Full Professor Vlado Radić, PhD Assistant doctoral student Nikola Radić, MS THE IMPORTANCE OF APPLIED RESEARCH OF NEW TECHNOLOGIES AND CONCEPTS OF INDUSTRIES 4.0	259
Assistant Professor Milivoje Pajović, PhD MONITORING THE SCIENTIFIC AND SOCIAL EFFECTS OF RESEARCH USING THE DOCUMENT CONTENT ANALYSIS METHOD	279
Assistant professor Ermin H. Kuka, PhD Assistant professor Emir Tahirović, PhD APPLYING RESEARCH IN PUBLIC POLICY ANALYSIS	291
Assistant Professor Vesko Lukovac, PhD Assistant Professor Nenad Teodorović, PhD Assistant Professor Dragan Pamučar, PhD AN APPROACH TO ESTIMATING BUSINESS ORGANIZATION IN THE FRAMEWORK OF THE PROCESS OF TRANSPORT OF PERISHABLE GOODS BY APPLICATION OF THE PROCESS FUNCTION METHOD	309
Slaviša N. Arsić, MA Full Professor Mitar Kovač, PhD IMPORTANCE OF APPLIED RESEARCH IN DEVELOPING THE CONCEPT OF FOOD SOVEREIGNTY OF COUNTRIES	319
Dipl. psychologist Jelena Petrović THE PROBLEMS OF APPLIED RESEARCHES IN SPORTS' PSYCHOLOGY	327
Bojan Kuzmanović, MA Assistant professor Miroslav Terzic, PhD THE IMPORTANCE OF APPLIED RESEARCHES FOR DEVELOPMENT OF MILITARY INTELLIGENCE PRACTICE	345

Assistant Nenad Galjak, MA	
Assistant professor Slavisa Tatomirovic, PhD	
THE USE OF GEOINFORMATION SYSTEMS IN APPLICABLE RESEARCH THROUGH THE EXAMPLE OF CARTOGRAPHIC MODELING OF DEMOGRAPHIC CHANGES AT THE TERRITORY OF THE CITY OF KRAGUJEVAC	359
Assistant Zoran Karavidić, MA	
APPLICATION OF THE MODELING METHOD IN THE MILITARY ACTIVITIES OPERATIONAL PLANNING PROCESS	379
Milan Kovačević, MA	
Dejan Nikolić, MA	
THE IMPORTANCE OF THE APPLIED RESEARCH IN THE PROCESS OF IDENTIFICATION OF THE IMPORTANT FACTORS OF WORK MOTIVATION FOR SERBIA PROFESIONAL MILITARY MEMBERS	389
Željko Jokić, MA	
RESEARCH APPLIED TO THE DEVELOPMENT OF THE TOTAL DEFENSE CONCEPT	403
Full professor Olja Arsenijević, PhD	
Associate professor Viktorija Nikolaevna Ryapukhina, PhD	
Associate professor Polona Šprajc, PhD	
QUALITATIVE RESEARCH IN ORGANIZATIONAL SCIENCES	417

Original scientific work

*Nedžo S. DANILOVIĆ**

*Milija BOGAVAC***

Faculty of Business and Law, University “MB”, Belgrade

*Dragan Lj. TANČIĆ****

Institute of Serbian Culture Pristina – Leposavic

GLOBAL ANALYSIS OF THE SITUATION IN THE FIELD OF RESEARCH AND DEVELOPMENT, FOCUSED ON APPLIED RESEARCH****

Abstract: The paper analyzes the global situation in the field of research and development by region from the epistemological standpoint. In doing so, global and regional trends in the allocation of R&D resources are illustrated in an argumentative, systematic and impartial manner. Through a detailed interpretation of the observed trends, we identified correlations of R&D investment between certain regions in the world and revealed regularities in the levels of development of regions (countries within them) and the total gross allocation to R&D from different sources (business sector, government budgets, higher education, private sector, abroad and unknown sources). The purpose of the research is to point out to the scientific and the general public in the world, especially to the governments of particular countries and international organizations, the current global and regional trends in investment and distribution of the total gross resources intended for research and development. The results of the research could help countries to assess the areas in which they need to be primarily engaged in order to significantly advance public policies in the field of research, development and innovation. The primary literature on which this research is based includes the documents and estimates of the UNESCO Institute for Statistics from June and February 2019, the UNESCO eAtlas of Research and Experimental Development, as well as the Report and Annexes on the European innovation scoreboard and indicator databases. Almost all basic methods of gathering

* Academic, Full Professor, danilovic.nedjo@gmail.com

** Full Professor, milija.bogavac@ppf.edu.rs

*** Professor, dragan_tancic@yahoo.com,

**** The article was created within the scientific research work of the SRO under the Agreement concluded with the Ministry of Education, Science and Technological Development number: 451-03-9 / 2021-14 / 200020 of February 5, 2021.

information with emphasis on analysis, synthesis, classification, generalization and inductive-deductive method were applied in the research. When it comes to the general scientific methods, the comparative method was used with previously defined unique comparables for comparison. Of the group of data acquisition methods, the method that was primarily applied was the one of content analysis of documents with qualitative and quantitative analysis technique.

Key words: research, development, innovation, region, gross domestic expenditure on research and development (GERD), gross domestic product (GDP).

INTRODUCTION

In the introduction of this review, we need to point out that scientific research is a specific mental creation of people through which they, by following the thought process of conceptualizing scientific projects, the postulates of science and principles of scientific research, as well as scientific procedure and academic skills, along with consistent application of scientific methods, techniques, tools and procedures, acquire true scientific knowledge.

The main purpose of science in society is to acquire true knowledge. The fact that so far there has not been a complete and satisfactory definition of the “scientific research” shows how far the modern world has progressed in acquiring true knowledge in different fields of science.

Although it is very difficult to define this concept from the epistemological standpoint, most methodologists believe that the term “scientific research” implies “an organized, systematic, useful, critically based, strictly controlled and repeatable process of acquiring scientific knowledge about a precisely defined subject of research with responsible application of properly selected scientific methods, techniques, tools and procedures and with strict adherence to scientific procedures”¹.

The basic structural elements of thus understood definition of “scientific research” are:

Complexity and organization that indicate that scientific research is a complex and organized whole, made up of a system of thought-physical, creative, routine and operational-technical, intellectual and manual processes and actions. As such a complex entity, scientific research is an organized process that is clearly subject-oriented and goal-oriented towards acquiring scientific knowledge about the subject of research.

Systematicity, meaning that scientific research is a functionally purposeful and arranged thought system in which a natural and logical sequence of its process is provided.

1 Milosavljević Slavomir, Radosavljević Ivan, *Osnovi metodologije političkih nauka* (treće izmenjeno i dopunjeno izdanje), Službeni Glasnik, Beograd, 2006, p. 57.

Controllability that requires that the research be conducted in as comfortable and controlled a condition as possible to exclude alternative possibilities in conceptualizing the research project and deviating from the scientific procedure in the research process itself.

Criticality which implies that all important claims about phenomena, processes, relationships and properties, in the area under study, must be objectively, honestly and reliably evaluated, verified and substantiated by appropriate arguments.

Verifiability of research results requiring its results to be intersubjectively verifiable, with the ability to be verified at any time by independent and competent individuals and scientific organizations.

In the social sciences, there are several classifications of scientific research that are performed according to different criteria. One of the most general classifications of research in the social sciences and humanities is the categorization into fundamental, applied, and developmental research, which can essentially be empirical, theoretical, and combined. Naturally, there are other numerous classifications of scientific research that, for the purpose of this review paper, we will not discuss in more detail.

In epistemological practice to date, scientific research organizations have not sufficiently addressed the types of scientific research, especially not the role and importance thereof for the development of science and for solving the problems of social practice of modern countries. For the past 10 years, the International Association of Methodologists of Social Sciences has been one of the few professional scientific associations in the world to have three different, but interrelated, types of scientific research at its three thematic international scientific conferences, namely: *“The role of prognostic research in the development of modern society”* (2013); *“The role of futurology in exploring the future of modern countries”* (2015), and *“The importance of applied research for the development of science and problem-solving in modern societies”* (2019). At these international thematic scientific conferences, there was a serious exchange of views on the possibilities of social and other sciences to, starting from scientific knowledge, current and existing paradigms of scientific fields and individual disciplines within them, as well as postulates of science and the origin of empirical-theoretical research, identify tendencies and discover trends in the achieved level of development of modern countries and, based on scientific knowledge, predict and pave the way for their further development in the future.

Thus, at three international thematic conferences, the highest professional scientific association in the field of social science methodology discussed the three most complex and interrelated types of scientific research - prognostic, futurological and applied research aimed at exploring the possibilities of development of modern countries and societies in the present and future. In 2016, the International Association of Methodologists of Social Sciences in Belgrade published Proceedings from the first two international thematic scientific conferences entitled *“SCIENCE AND THE FUTURE”*.

The subject of the third international scientific thematic conference, held on November 15, 2019, was applied research and its importance for the development

of science and problem-solving in modern countries. The main purpose this conference was to critically understand the regularity and legality of natural and social phenomena, processes and relationships from different fields of science and to apply the results of scientific knowledge for the advancement of both the theory of specific scientific disciplines in different fields of science and social practice in modern countries.

From an epistemological standpoint, the primary role of applied research in the social sciences is to understand the regularity and legality of the attained level of development of modern countries and to find more rational, efficient and effective possibilities for the application thereof in the present and future development of countries in all areas of social life.

The basic social function of this type of research is for the recognized regularities and legalities within and between certain phenomena, processes and relationships to find their practical application in the researched areas of social life, with the ultimate goal of improving: political, economic, social, cultural, security, information and communication, technological and natural systems, and to maximize environmental protection and preserve human health in modern societies. A well-planned, designed and properly targeted applied research in various scientific fields drives modern societies forward. The results of these studies help the legislative and executive authorities to more easily formulate realistic and achievable goals for the political, economic, social and cultural development of modern countries in the future.

The primary criterion for the success of applied research in socio-humanistic and other fields of science is a concrete contribution to solving practical problems in certain areas of economic and social life. The contribution of applied research to solving practical problems in the economy and society depends, above all, on the political will of the society actors and the economic strength of each of the modern countries.

1. ASSESSMENT OF THE CURRENT STATE OF RESEARCH AND DEVELOPMENT IN THE WORLD

An analysis of the global situation in science, technological development and innovation in the world indicates that a relatively small number of developed countries have scientific and research potential and that during the economic recession they achieve significant results in many areas of social life. In these countries, the excellence of scientific research has been raised to a high level, and the level of technological development achieved enables them to maintain a privileged position in the world economy.

On the other hand, in most developing and underdeveloped countries:

(1) the excellence of scientific research and its relevance to the economic and social development of society as a whole is not sufficiently supported by financial resources;

(2) there are no systematic financial instruments and institutional frameworks in place for linking science, the economy, the public and the private sector;

(3) the system of managing scientific and innovation organizations and their coordination with relevant business, public and private sector institutions are inadequate, ineffective and inefficient;

(4) there is a lack of inventive human resources in research organizations, the economy, the public and the private sector;

(5) science in these countries is not fully integrated into the regional and global research space;

(6) in developing and underdeveloped countries there are few scientists participating in international projects and there are not enough new discoveries, patents and technical solutions that contribute to the faster economic and overall development of these countries and societies.

(7) economic, social, information and technological systems in these countries have not sufficiently stepped into science-based development, and there has not been a favorable environment within and around them that stimulates economic, social, technological and socio-cultural change and innovation in order for them to enhance their competitiveness regionally and globally.

The current situation in this area is such that very few countries invest in R&D between 1.1% and 2.64% of total resources, while most countries invest below 1% of total resources and 0.5% of budgetary resources (GDP). In a significant number of countries, basic, applied and developmental, theoretical and empirical, diagnostic and prognostic studies are not supported by an adequate funding model, regardless of the awareness of their relevance to economic and overall social development.

Swot analysis of the situation in the field of R&D, in the last 10 years, identified the main weaknesses, dangers, chances and opportunities for improving the situation in this field.

The *main weaknesses* of strategic R&D policies in modern countries could be synthesized in three groups, more specifically:

1) low quality of the public research and innovation system, especially in developing and underdeveloped countries;

2) insufficient cooperation and exchange of knowledge between public research organizations, the business sector and social institutions, and

3) limited opportunities for modern countries, especially underdeveloped countries and developing countries, to invest in research, innovation and development.

In terms of the first group of weaknesses, there is a significant disparity in the quality of the public R&D system between and within certain continents, regions and countries. These differences are due both to the low level of public investment in R&D and the way in which those investments are distributed.

In order for the economic and social entities in modern countries to maximize profits from investment in R&D, it is necessary for the government to provide them with a good and favorable system environment in which knowledge could be transformed into business or social profit. It depends not only on

the results of scientific research carried out by public research organizations, but also on the systemic conditions in which they act and operate. That is why the key task of national authorities in all countries is to enable such a political, regulatory, economic, social and cultural environment conducive to investment, entrepreneurial activities and important state decisions in the field of research and development by implementing structural reforms and introducing more effective policy instruments at national, regional and local levels of government that encourage basic, applied and development research in all sectors of contemporary society. The essence of all the efforts of modern countries is to build a stable political, economic, social, cultural and legal system in which human rights and freedoms, political pluralism, parliamentary democracy and the rule of law, as well as market economy with incentive tax and financial systems for research and development will be respected, with the continued availability of skilled labor, increase in the efficiency of public administration at all levels and the full integration of science into the wider research area.

The best options for modern states to respond to such R&D challenges are:

firstly, to increase the quality of research and innovation carried out by public research organizations, primarily through greater direct investment in fundamental, applied and developmental research and the innovations resulting therefrom;

secondly, to choose the best model for allocating public R&D funds;

thirdly, to carry out institutional reforms of the public R&D system;

fourthly, to increase the internal and international mobility of researchers, and

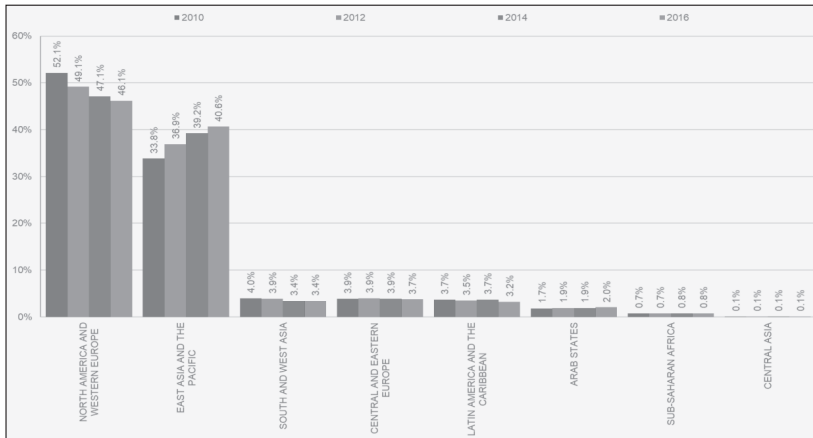
fifthly, to apply a number of other instruments of strategic policy of countries in aligning public research capacities with the capabilities of the economy and society of each country.

The analysis of strategic R&D policies within the second group of weaknesses confirmed that in most countries there is insufficient knowledge sharing between the public and private sectors, especially between public research organizations and the economic (business) sector, especially in the form of direct investments of economic and social entities in specific projects of basic, applied and other research carried out by public research organizations.

The results of the epistemological analysis of the third group of weaknesses related to the limited possibilities of modern countries to invest in R&D confirmed the starting assumption that R&D investments in most countries in the world are not in line with the needs of modern societies.

The relevant evidence that we provide in an argumentative way in this paper just confirms the starting hypothetical assumption. In an illustrative way, we show global and regional trends in the allocation of R&D resources by region in the world. All gross domestic expenditure on R&D (GERD) indicators by region are expressed in purchasing power parity (PPP \$) and R&D intensity (percent of gross domestic product (GDP)), as seen in Chart 1 of the UNESCO Institute for Statistics².

Chart 1. Distribution of R&D expenditures by region

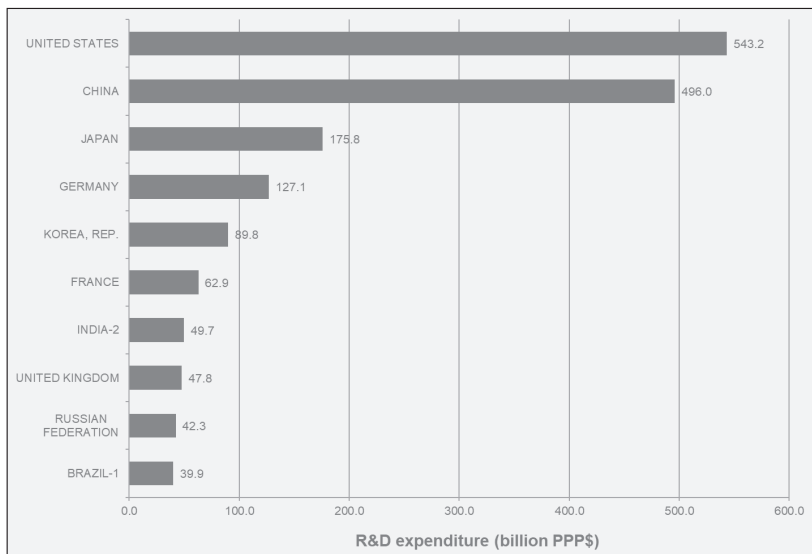


Source: UNESCO Institute for Statistics Estimates, February 2019

Chart 1 shows that the countries of North America, Western Europe, East Asia and the Pacific have the highest gross domestic expenditure on research and development (GERD), expressed in purchasing power parity (PPP \$).

According to the UNESCO Institute for Statistics from July 2019, global spending on R&D reached \$ 1.7 trillion. The 10 most developed countries account for 80% of total spending, and all other countries spend the rest of 20% on this significant modern society activity.

Chart 2. Countries with the highest total GERD investment (billion PPP\$) in 2017



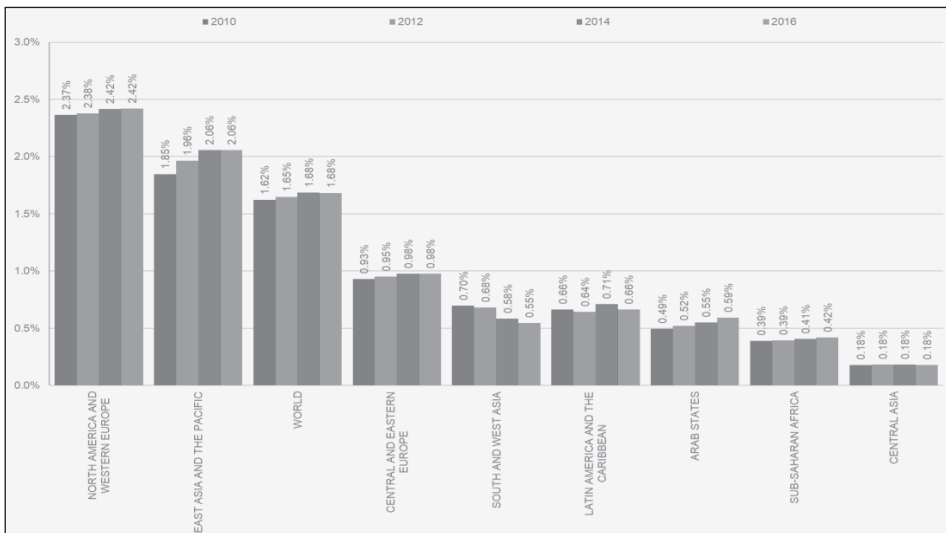
Notes: -1 = 2016, -2 = 2015.

Source: UNESCO Institute for Statistics, June 2019

Chart 2 shows unequivocally that the United States and the People’s Republic of China, of all the countries analyzed, have the highest R&D expenditure, about \$ 1.039.2 billion. If we include the total gross investment in R&D by Japan (\$ 175.8 billion), the Federal Republic of Germany (\$ 127.1 billion), Korea (89.8), France (62.9), India (49.7)), the United Kingdom (47.8), the Russian Federation (42.3) and Brazil (\$ 39.9 billion), then this accounts for about 80% of the total gross expenditure that all countries in the world allocate to R&D.

This long-term R&D spending situation is not sustainable as it leads to a lag in the development of the largest number of countries in the world. In order for this situation to be significantly improved, it is necessary for all countries, without exception, to significantly increase public and private R&D expenditures, as well as to radically increase the number of researchers relative to the population and to increase the number of patents relative to the total number of researchers.

Chart 3. R&D allocation from Gross Domestic Product by region



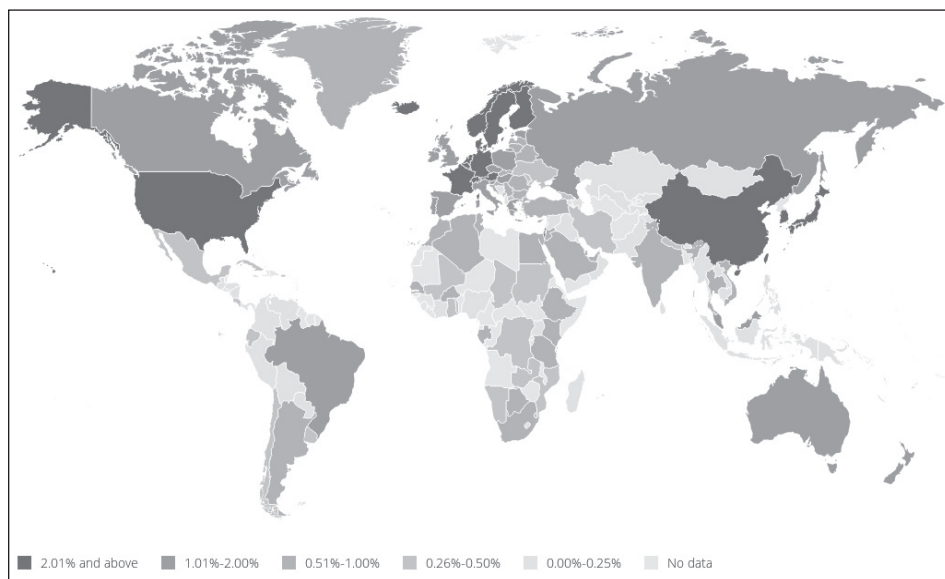
Source: UNESCO Institute for Statistics Estimates, February 2019

Chart 3 illustrates the intensity of R&D investment by region over the past few years³. The chart shows that the regional averages of R&D share of GDP in 2016 were: 2.42% for North America and Western Europe; 2.06% for East Asia and the Pacific; 1.68% for the world at large; 0.98% for Central and Eastern Europe; 0.55% for South and West Asia; 0.66% for Latin America and the

3 R&D intensity represents the percentage of gross domestic product (GDP) devoted to R&D activities.

Caribbean; 0.59% for Arab countries; 0.55% for South and West Asia; 0.42% for Sub-Saharan Africa and 0.18% for Central Asia. Regional average R&D share of GDP did not increase significantly from 2010 to 2019. Moreover, the R&D share of GDP declined slightly in the countries of South and West Asia, Latin America and the Caribbean.

Figure 1. Gross domestic expenditure on R&D as a percentage of GDP, 2017

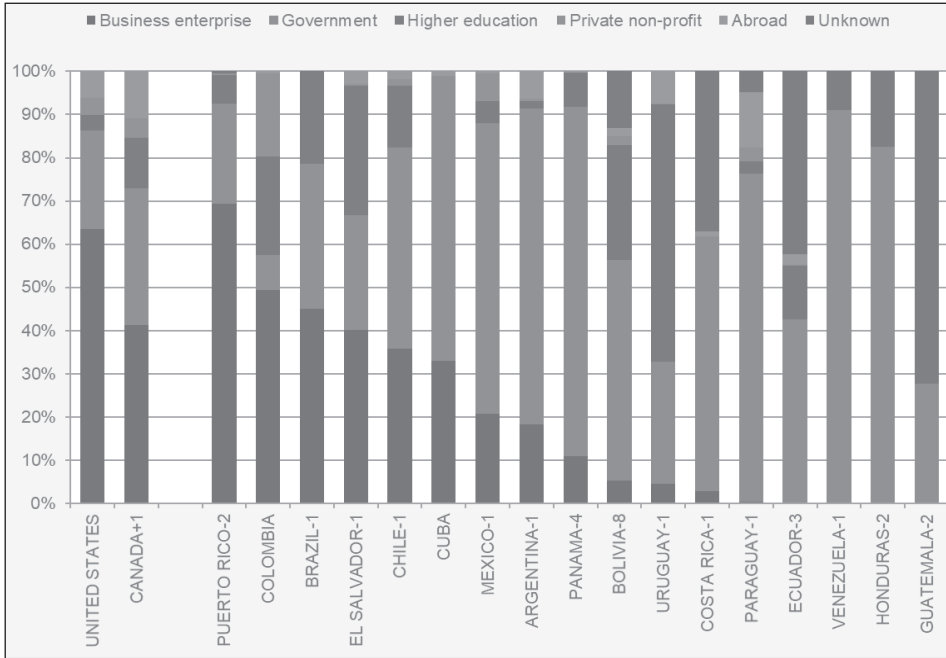


Source: UNESCO Institute for Statistics, June 2019

Figure 1 illustrates the R&D investment intensity as a percentage of GDP for 2017 by region. The figure shows that countries of North America and Western Europe allocate the highest percentage of GDP for R&D, namely 2.01% and above; countries of East Asia and the Pacific from 1,01 - 2,00%; countries of Central and Eastern Europe, South and West Asia, Latin America and the Caribbean and Arab countries from 0,51 - 1,00%; countries of sub-Saharan Africa from 0,26 - 0,50%; Central Asian countries from 0,00 - 0,25%.

Looking at R&D investments by sector (business enterprises, government budgets, higher education and private nonprofit organizations) in various regions of the world, it can be noticed that the largest amounts in the Americas, in percentages, were invested by business enterprises in Puerto Rico (69%), the United States of America (64%), Colombia (49%), Brazil (45%), Canada (41%), El Salvador (40%), Chile (36%), Cuba (32%), Mexico (21%), Argentina (18%), Panama (11%), Bolivia (4%), Uruguay (2%) and Paraguay, Ecuador, Venezuela, Honduras and Guatemala below 1%.

Chart 4. Funding in the Americas, GERD by source of funds, 2017



Notes: +1 = 2018, -1 = 2016, -2 = 2015, -3 = 2014, -4 = 2013, -8 = 2009.
 Source: UNESCO Institute for Statistics, June 2019

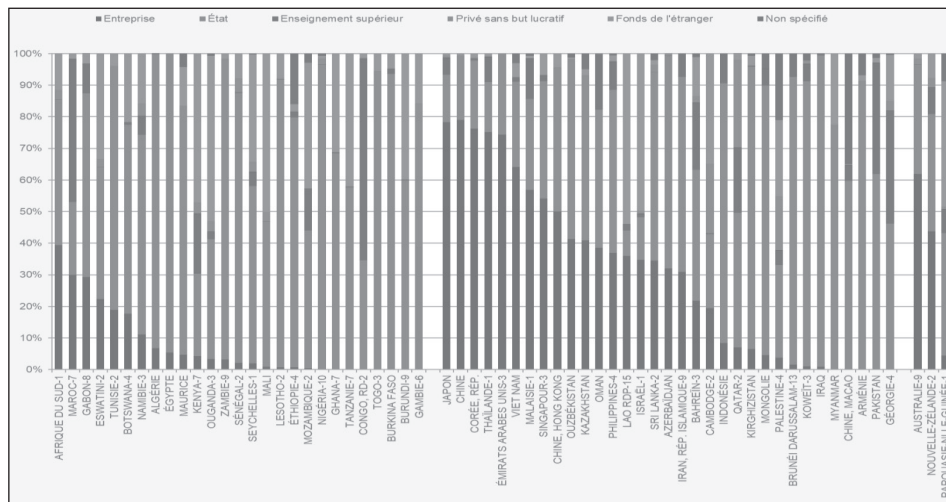
At the same time, the governments of certain countries of the Americas invested the most in R&D. More specifically, these countries were Venezuela (91%), Honduras (83%), Paraguay (76%), Argentina (70%), Mexico (68%), Cuba (64%), Costa Rica (61%), Bolivia (56%), Chile (46%), Ecuador (42%), Brazil and Canada (33%), Guatemala (28%), USA (25%), Puerto Rico (23%), etc.

In the field of higher education, in the Americas, the countries with the highest spending on R&D were Guatemala (71%), Uruguay (60%), El Salvador (30%), Bolivia (27%), Canada, Ecuador, Chile and Honduras (12-15%), Paraguay, Argentina, Brazil, Mexico and USA (2-5%).

The private sector in the Americas region has invested little in R&D. The largest gross private sector R&D investments were in Colombia (28%), Mexico (8%), USA and Canada (5%), Chile, Bolivia and Panama (4-5%), Paraguay, Bolivia and Uruguay (1-2%).

Of all the sectors in the countries of the Americas, the lowest percentage of allocations to R&D was from foreign sources, while some countries had a significant percentage of investment in this area from unknown sources, e.g. Ecuador (42%), Costa Rica (38%), Brazil (19%), Bolivia (14%) and Paraguay (5%), which is a mystery for researchers that needs to be further explored.

Chart 5. Funding in Africa, Asia and the Pacific, GERD by source of funds, 2017



Notes: -1 = 2016, -2 = 2015, -3 = 2014, -4 = 2013, -6 = 2011, -7 = 2010, -8 = 2009, -9 = 2008, -10 = 2007, -13 = 2004, -15 = 2002.

Source: UNESCO Institute for Statistics, June 2019

In the more developed countries of Asia, the business sector has the largest total gross investment in R&D, while in the less developed countries of the region, the largest investments are from the government budget, which correlates with the results in Europe. Higher education invests most in R&D in Pakistan 36%, Qatar and Bahrain 20%, Oman 18%, Malaysia 15%, Philippines 10%, etc. Private sector investment in R&D in Asian countries is negligible. An analysis of UNESCO Bureau of Statistics data from June 2019 shows that a significant percentage of total gross investment in R&D in the countries of this region comes from unknown sources. The highest percentage is in the following countries: China, Macau 36%, Mongolia 22%, Indonesia and Armenia 9%. Investment in R&D from foreign sources is a significant boost to the overall development of the countries in this region, with the largest being in Laos 55%, Israel 51%, Bahrain 35%, Palestine 25% and Myanmar 23%.

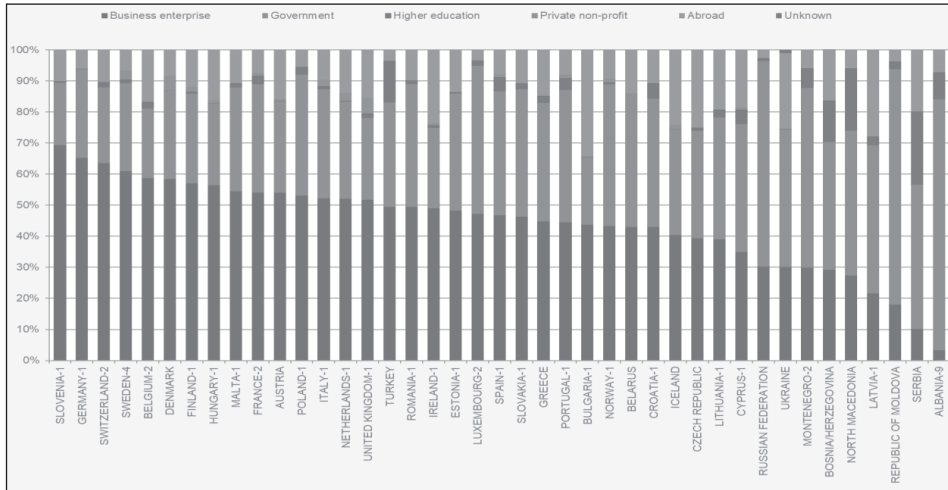
In Africa, the largest percentage of R&D investment comes from those countries' governments' budgets, then from foreign sources, the business sector, to a lesser extent from the private sector, and in some cases from unknown sources (Ethiopia, Mauricius and Mozambique).

Dominant R&D investments in the Australia and New Zealand region come from the business sector, 62% and 44% respectively, then 35 to 39% from the government budget, 2 to 8% from foreign sources and 3 to 5% from the private sector.

Compared to the American and other global regions, according to the UNESCO Institute for Statistics data from June 2019, the business sector has invested the most of total gross assets in R&D in nearly two-thirds of European countries (30 to 70%, depending on the country). The average R&D intensity in

the EU business sector is 1.36% of GDP. In only six countries (Israel, Sweden, Switzerland, Austria, Germany and Denmark) the R&D intensity in the business sector was about 2.00% of GDP and in ten countries the intensity was below 0.50% of GDP. It is especially low in North Macedonia and Latvia⁴. It was noted that business sectors in the more developed countries of Western and Northern Europe invest more in R&D than those in less developed countries, especially in Central, Eastern and Southeastern Europe.

Chart 6. Funding in Europe; GERD by source of funds, 2017



Notes: -1 = 2016, -2 = 2015, -4 = 2013, -9 = 2008.

Source: UNESCO Institute for Statistics, June 2019

Also, the regularity of investments in R&D by the governments of European countries was observed, which indicates that the less developed countries are, the more proportionally the government budget allocations increase, i.e. the more economically developed countries are, the more the allocations decrease. This finding is correlated with previous findings on European countries' business sector investment in R&D.

In most European countries, there is a relatively small percentage of R&D investment among the higher education sector, ranging from an average of 1% to 26%. Countries with the largest percentage are Serbia, North Macedonia, Bosnia and Herzegovina, Turkey, Albania, Montenegro, Croatia and Cyprus.

When it comes to the private sector, in a large number of European countries there is little investment in R&D, ranging from 5-10% in the UK and Denmark, while in other countries, private sector investment in R&D is 1-5%.

Analyzing Southeast European investment in R&D (Table 1), it can be concluded that Slovenia and Greece allocate 2.4% of their GDP for R&D, while Hungary allocates 1.4%, which is above the European average.

4 See more: European Innovation Scoreboard 2019: Annex B - Performance per indicator, p. 14.

Table 1. Investment of Southeast European countries
in R&D in 2018

Country	spending on R&D as a percentage % of GDP	spending on R&D in PPP \$	breakdown of R&D by performance sectors		number of researchers per million people			notes
					total	M	F	
1	2	3	4	5	6	7	8	9
Greece	2,4 %	2,436.0 M	business enterprise	852,300.5 k	2.652	61%	39%	
			government	675,284.5 k				
			universities	905,201.0 k				
			priv. sector	30,238.8 k				
			unknown	0,0 \$				
Slovenia	2,4 %	1,505.7 M	business enterprise	1,164.5 M	4.140	64%	36%	
			government	183,156.4 k				
			universities	157,400.0 k				
			priv. sector	615,657.3 k				
			unknown	0,0 \$				
Hungary	1,4 %	3,408.4 M	business enterprise	2,437.9 m	2.671	70%	30%	
			government	468,326.0 k				
			universities	460,048.8 k				
			priv. sector					
			unknown					
Turkey	0,9 %	2,436.0 M	business enterprise	825,300.5 k	1.163	63%	37%	
			government	675,284.5 k				
			universities	905,201.0 k				
			priv. sector	30,238.8 k				
			unknown	0,0 \$				
Bulgaria	0,8 %	1,005.4 M	business enterprise	660,825.5 k	1.827	51%	49%	
			government	248,478.2 k				
			universities	88,536.6 k				
			priv. sector	7,536.0 k				
			unknown	0,0 \$				
Croatia	0,8 %	732,220.0 k	business enterprise	353,309.6 k	1.436	51%	49%	
			government	190,814.3 k				
			universities	188,094.1 k				
			priv. sector	1,004.1 k				
			unknown	0,0 %				

1	2	3	4	5	6	7	8	9
Serbia	0,8 %	755,851.8 k	business enterprise	224,147.3 k	1.803	51%	49%	
			government	184,866.6 k				
			universities	346,621.9 k				
			priv. sector	213,909.0 k				
			unknown	0,0 \$				
North Macedonia	0,5 %	143,452.5 k	business enterprise	15,313.9 k	837	51%	49%	
			government	21,515.3 k				
			universities	105,381.0 k				
			priv. sector	1,279.2 k				
			unknown	0,0 \$				
Montenegro	0,4 %	34,713.9 k	business enterprise	13,375.3 k	670	50%	50%	
			government	7,391.1 k				
			universities	12,974.5 k				
			priv. sector	972,952.2 \$				
			unknown	0,0 \$				
Romania	0,4 %	1,569.5 M	business enterprise	650,606.2 k	906	54%	46%	
			government	674,170.3 k				
			universities	238,865.4 k				
			priv. sector	5,823.6 k				
			unknown	0,0 \$				
Bosnia and Herzegovina	0,3 %	102,416.6 k	business enterprise	19,865.2 k	285	56%	44%	
			government	19,463.6 k				
			universities	61,949.9 k				
			priv. sector	1,137.9 k				
			unknown	0,0 \$				
Albania	0,2 %	37,375.6 k	business enterprise	0,0 \$	156	56%	44%	
			government	19,472.1 k				
			universities	17,903,5 k				
			priv. sector	0,0 \$				
			unknown	0,0 \$				

Source: the author

R&D allocations in Turkey (0.9% of GDP) and in Serbia, Bulgaria and Croatia (0.8% of GDP) are within or below the European average, while the allocations of North Macedonia of 0.5%, Montenegro 0.4%, Bosnia and Herzegovina 0.3% and Albania 0.25, are well below the European average of R&D investment. If such percentages of GDP spending on R&D continue, a further lag in the development of these countries can be expected, which will hinder their integration into the European community and cause new political, economic, social and security difficulties in this part of Europe.

CONCLUSION

From the totality of the research results reported in this paper comes a logical epistemological conclusion, which has a strong foundation in the theory and practice of general and specific methodologies of sciences, that scientific research is a specific spiritual creation of people through which they, by following the thought process of conceptualizing scientific projects, postulates of science and principles of scientific research work, as well as by strictly adhering to scientific procedures and academic skills, with consistent application of scientific methods, techniques, tools and procedures, acquire exclusively true scientific knowledge.

Based on the existing knowledge and results of this research, the term scientific research implies a planned and organized, systematic and purposeful, critically based, strictly controlled and repeatable process of acquiring scientific knowledge about a defined subject of research, with the application of properly selected scientific methods, techniques, instruments and procedures, and respect for scientific procedures and apparatus in the process of reaching the scientific truth.

The main global-level threats to R&D in the near future will be reflected in:

- a low level of total and budgetary investments in research and innovation, especially in underdeveloped and developing countries;
- the absence of strategic R&D management in most modern countries;
- the insufficient number of researchers in economic activities and lack of mechanisms for systematic cooperation between scientific research organizations in the public sector and the economy;
- a small number of patents and technical solutions in the field of economy, services and social activities that advance the economic and overall social development of modern countries.

In developing and underdeveloped countries, including countries in the SEE region, especially in the Western Balkans, the greatest dangers in R&D are:

- a low level of economic and overall social development;
- departure of highly educated staff from underdeveloped to developed countries, due to the inability to display research skills and meet the needs of the countries of origin;
- insufficient equipment of scientific organizations with modern technologies, IT and other equipment for research and innovation in the public sector and in the economy;
- low level of inter-sectoral coordination in research and innovation funding, and
- insufficient recognition of the need to build national innovation systems by institutions at all levels of government in these countries.

In order to overcome the current situation in the field of research, development and innovation, it will be essential to improve the efficiency and effectiveness of the scientific research system in all countries, through a number of activities aimed at:

1. increasing investment in R&D through public funding and stimulating business sector investment.

2. creating new knowledge, developing and improving existing technologies, and solving complex social and economic problems in modern countries;

3. educating high quality research staff who will be able to create new values with their knowledge and scientific research work, as well as to conceive and generate economic, social, political, cultural and overall social development of modern countries;

4. fostering the excellence and relevance of scientific research relevant for the development of scientific fields and for solving the accumulated problems of social practice in modern countries;

5. strengthening the link between science, economy and society in research and innovation;

6. establishing an effective science and innovation management model;

7. ensuring the excellence and availability of human resources for science, the economy and social activities;

8. promoting international cooperation in the field of science and innovation.

Improving the efficiency and effectiveness of scientific research systems in modern countries will not be possible without a significant investment in the development of all fields of science and greater respect for general and specific methodologies of scientific research. Only with strict adherence to the requirements of modern scientific research methodologies, greater involvement of methodologists in research, and with increased investment in research, development and innovation can basic, applied and developmental, theoretical-emirical, diagnostic and prognostic research be conducted in the desired direction, without which there is no political, economic, social and cultural prosperity of modern countries in the future.

WORKS CITED

UNESCO Institute for Statistics, June 2019.

UNESCO Institute for Statistics estimates, February 2019.

UNESCO eAtlas of Research and Experimental Development at <http://on.unesco.org/RD-map>

European Innovation Scoreboard 2019, Luxembourg: Publications Office of the European Union, 2019.

The European Innovation Scoreboard report and annexes, and the indicators database are available at:

https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/index_en.htm

Nedo DANILOVIĆ

Milija BOGAVAC

Poslovni i pravni fakultet, Univerziteta "MB"

Dragan TANČIĆ

Institut za srpsku kulturu Priština – Leposavić

ANALIZA GLOBALNOG STANJA NA POLJU ISTRAŽIVANJA I RAZVOJA SA OSVRTOM NA PRIMENJENO ISTRAŽIVANJE

Rezime

U ovom radu se, na globalnom nivou i sa epistemološkog stanovišta, analizira situacija na polju istraživanja i razvoja po regionima. Pritom su svetski i regionalni trendovi u raspodeli sredstava za istraživanje i razvoj prikazani na argumentovan, sistematski i nepristrasan način. Tumačenjem uočenih trendova, utvrđene su korelacije ulaganja u istraživanje i razvoj među pojedinim regionima u svetu, i otkrivene su pravilnosti u nivoima razvoja regiona (zemalja unutar istih) kao i u ukupnim bruto izdvajanjima za istraživanje i razvoj iz različitih izvora (poslovni sektor, budžeti vlade, visoko obrazovanje, privatni sektor, inostranstvo i nepoznati izvori). Svrha ovog istraživanja jeste ukazivanje naučnoj i široj javnosti u svetu, posebno vladama pojedinih zemalja i međunarodnim organizacijama, na trenutne svetske i regionalne trendove u ulaganju i raspodeli ukupnih bruto sredstava namenjenih istraživanju i razvoju. Rezultati istraživanja mogli bi pomoći zemljama da uvide koje su to oblasti kojima naročito moraju da se posvete kako bi značajno unapredili javne politike u oblasti istraživanja, razvoja i inovacija. Primarna literatura na kojoj se temelji ovo istraživanje uključuje dokumente i procene UNESCO-ovog Instituta za statistiku iz februara i juna 2019. godine, UNESCO-v eAtlas za istraživanje i eksperimentalni razvoj, Izveštaj i Priloge o Evropskim inovacionim rezultatima i bazama podataka sa pokazateljima, kao i druge izvore navedene u literaturi. U istraživanju su primenjene gotovo sve osnovne metode saznanja, sa akcentom na analizi, sintezi, klasifikaciji, generalizaciji i induktivno-deduktivnoj metodi. Od opštenaučnih metoda korišćena je komparativna metoda uz prethodno definisane jedinstvene komparabile za poređenje. Iz grupe metoda za prikupljanje podataka, pretežno je primenjena metoda analize sadržaja dokumenata.

Ključne reči: istraživanje, razvoj, inovacija, region, bruto domaći izdaci za istraživanje i razvoj (GERD), bruto domaći proizvod (BDP).