ISSN (Štampano izd.) 1450-7005
ISSN (Online) 2620-1461
UDK 657(497.11)

Revizor

GODINA XXVIII • BROJ 1 (109) • MART 2025.

Journal of Organizational Management, Finance and Auditing

Časopis za upravljanje organizacijama, finansije i reviziju

ND-UPORG
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Izdavač / Publisher
Naučno društvo za upravljanje organizacijama / Scientific Society for Organizations' Management

Adresa redakcije / Editorial Office Address
Naučno društvo za upravljanje organizacijama / Scientific Society for Organizational Management
Josifa Marinkovića 2A
11000 Beograd (Savski venac)
Tel: +381 63 278 095
casopisrevizor@outlook.com
https://casopisrevizor.rs

Štampa / Printed by
SKRIPTA Internacional, Beograd

Tiraž / Circulation
100 primeraka / 100 Copies

Časopis je indeksiran od strane Ministarstva prosvete, nauke i tehnološkog razvoja.

Internet adresa baze podataka u kojoj su članci dostupni u vidu punog teksta do 2021:
https://scindeks.ceon.rs/journaldetails.aspx?issn=1450-7005

Časopis izlazi tromesečno (mart, juni, septembar i decembar) • Godišnja pretplata – 12.000,00 dinara, PDV uračunat

Uređivački odbor / Editorial Board

Članovi iz Srbije / Members from Serbia

Međunarodni uređivački odbor / International Editorial Board

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Uvodnik

Koliko košta jedna godina školovanja?

Nedavno objavljena publikacija Svetske banke "EUROPE AND CENTRAL ASIA STUDIES GREATER HEIGHTS Growing to High Income in Europe and Central Asia" o mogućnostima zemalja sa sredjim dohotkom iz Evrope i Centralne Azije (ECA), među kojima je i Srbija, da dostignu zemlje sa visokim dohotkom ukazuje da je malo verovatno da se takav uspeh ostvari.

Najveća prepreka za privredni rast ogleda se u nedostatku novih i neodgovarajućem korišćenja postojećih talenata. Da li su društva usmerena na privredni rast i koliko se talenti dece dobro koriste meri se stepenom socijalne mobilnosti. Socijalna mobilnost označava sposobnost pojedinca ili grupe da promeni svoj društveni položaj ili socijalni status unutar društvenog sistema. Socijalna mobilnost pokazuje koliko je moguće da ljudi napreduju ili nazaduju u društvenoj hijerarhiji, obično u smislu ekonomske situacije, obrazovanja, zanimanja ili društvenog prestiža. Rezultati PISA testova pokazuju da u ECA regionu socijalna mobilnost među mlađim generacijama opada, pre svega zbog značajnog pogoršanja kvaliteta obrazovanja tokom poslednjih nekoliko decenija. Tako na primer, rezultati PISA testova iz matematike pokazuju da su tokom protekle decenije deca izgubila ekvivalent jedne pune godine školovanja. Slična situacija je i u visokom obrazovanju.

U publikaciji se navodi da su akademska zarobljavanja, kao situacija u kojoj univerziteti stavljaju političke ili poslovne interese ispred akademske izvrsnosti, neadekvatno finansiranje, zastareli nastavni planovi i programi, nedostatak moderne infrastrukture i širenje visokoobrazovnih institucija među vodećim uzrocima lošeg kvaliteta tercijarnog obrazovanja. Pojedinci sa visokim obrazovanjem imaju veće šanse da postanu inovatori. Loš kvalitet univerzitetskog obrazovanja predstavlja osnovni rizik za dugoročne izglede rasta u regionu. Da bi se ojačala socijalna mobilnost i podstakle inovacije, zemlje ECA moraju dramatično revidirati obrazovne sisteme, posebno stručno i univerzitetsko obrazovanje. Stručno obrazovanje treba razvijati jačanjem veza sa privatnim sektorom, u cilju savladavanja temeljnih veština. Istraživački centri treba da budu integrisani u univerzitete.

Razmatrajući mogućnost dolaska stranih visokoobrazovnih institucija, postavlja se pitanje kako bi to uticalo na postojeće stanje u obrazovanju. Potrebno je razmotriti kako bi ova integracija mogla doprineti razvoju aktuelnih obrazovnih praksi. Neophodno je identifikovati moguće uticaje na obrazovni sistem, uzimajući u obzir potencijalne koristi, kao i izazove u pogledu održivosti, i sinergije sa postojećim obrazovnim pristupima.

Editorial

How much does one year of education cost?

The recently published World Bank report "EUROPE AND CENTRAL ASIA STUDIES GREATER HEIGHTS: Growing to High Income in Europe and Central Asia" explores the prospects of middle-income countries in Europe and Central Asia (ECA), including Serbia, reaching high-income status. The publication suggests that such success is unlikely.

The greatest obstacle to economic growth lies in the lack of new talent and the inadequate use of existing talent. Whether societies are focused on economic growth and how well they utilize children's talents is measured by the level of social mobility. Social mobility refers to the ability of an individual or group to change their social position or status within a social system. It indicates how likely people are to move up or down the social ladder, usually in terms of economic standing, education, occupation, or social prestige. PISA test results show that social mobility among younger generations in the ECA region is declining, primarily due to the significant deterioration in education quality over the past few decades. For example, PISA mathematics scores indicate that children have effectively lost the equivalent of an entire year of schooling over the last decade. A similar situation exists in higher education.

The publication highlights that academic capture—where universities prioritize political or business interests over academic excellence—inadequate funding, outdated curricula, lack of modern infrastructure, and the proliferation of higher education institutions are among the main causes of poor quality in tertiary education. Individuals with higher education are more likely to become innovators. The poor quality of university education poses a fundamental risk to the region's long-term growth prospects. To strengthen social mobility and encourage innovation, ECA countries must drastically reform their education systems, especially vocational and university education. Vocational education should be developed through stronger ties with the private sector to ensure mastery of foundational skills. Research centers should be integrated into universities.

In considering the possibility of foreign higher education institutions entering the region, the question arises of how this would impact the current state of education. It is necessary to assess how this integration could contribute to the development of existing educational practices. Potential impacts on the education system must be identified, considering both the possible benefits and the challenges related to sustainability and synergy with current educational approaches.

Jozefina Beke-Trivunac[1]
Snežana Knežević[2]
Vesna Bogojević Arsić[3]

ORIGINALNI NAUČNI RAD
UDK 336.145:378(497.11)

DOI: 10.46793/Rev25109.001BT
Primljen: 15.02.2025.
Prihvaćen: 15.03.2025.
Objavljen Online First: 26.02.2025.
Objavljen: 31.03.2025.

Finansiranje visokoškolskih ustanova u javnom sektoru Republike Srbije*

Rezime: *U ovom radu razmatra se finansiranje visokoobrazovanih ustanova u 2023. i 2024. godini u vlasništvu Republike Srbije. Cilj rada je da se na jednom mestu celovito sagleda okvir izvora finansiranja i namenske upotrebe tih sredstava. Korišćeni podaci pribavljeni su iz zvaničnih izvora sa sajta Ministarstva finansija, Ministarstva prosvete, Republičkog zavoda za statistiku, Pokrajinskog sekretarijata za finansije Autonomne pokrajine Vojvodine (APV) i Filozofskog fakulteta u Univerziteta u Beogradu. Svi izvori podataka javno su dostupni. Pribavljeni podaci sistematizovani su po visokoškolskim ustanovama tako da se ukupni izvori finansiranja mogu grupisati po namenama. Raspoloživi podaci pružili su mogućnost kreiranja nekoliko jednostavnih pokazatelja rezultata raspodele. Za ilustraciju izvora prihoda i vrste troškova korišćen je primer finansijskih izveštaja Filozofskog fakulteta Univerziteta u Beogradu. Podaci pokazuju da 53% prihoda ostvarenih u 2023. godini potiče od Ministarstva prosvete, 13% pri hoda su sopstveni prihodi visokoškolskih ustanova, a 33% iz sredstava odobrenih za naučne projekte, najvećim delom od strane Ministarstva nauke, tehnološkog razvoja i inovacija. Istraživanje ukazuje i na velike nedostatke u regulativi o izveštavanju o finansijskom poslovanju visokoškolskih ustanova. Visokoškolske ustanove su ustanove od javnog značaja, i prirodno je da na pregledan način objavljuju podatke i informacije o planovima i rezultatima svog poslovanja. Ovo je pogotovo važno što skoro dve trećine studenata samostalno finansira svoje školovanje.*

Ključne reči: *javno visoko obrazovanje, struktura finansiranja visokoobrazovnih ustanova, efikasnost upotrebe sredstava za finansiranje javnog visokog obrazovanja*

[1] ALFA BK Univerzitet, Srbija.
E-mail: jozefina.beke@alfa.edu.rs
ORCID iD: https://orcid.org/0000-0002-7394-7006

[2] Univerzitet u Beogradu, Fakultet organizacionih nauka, Srbija.
E-mail: snezana.knezevic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0001-9833-7274

[3] Univerzitet u Beogradu, Fakultet organizacionih nauka, Srbija.
E-mail: vesna.bogojevic.arsic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0002-4491-2509

* Rad pod nazivom "Finansiranje visokoškolskih ustanova u javnom sektoru Republike Srbije", zbog aktuelnosti teme, objavljen je unapred kao "online first" na sajtu časopisa, uz napomenu da su svi predlozi za unapređenje teksta dobrodošli i da će ih autori uzeti u obzir kao validne recenzije. Primedbe primljene do momenta prihvatanja rada ugrađene su u tekst.

UVOD

Tradicionalan pristup finansiranju obrazovanja u Srbiji je da školovanje na svim nivo ima obrazovanja treba da bude svima dostupno, što znači besplatno ili što je moguće jeftinije. U tom smislu, od države se očekuje da finansira i školovanje na visokoškolskim ustanovama. Pojava privatnih visokoškolskih ustanova, na kojima se troškovi studiranja ne finansiraju iz državnog budžeta, već ih student sam plaća, unela je novu dimenziju u oblast sticanja visokog obrazovanja1. Na privatnim visokoškolskim ustanovama danas studira oko 13% od ukupnog broja studenata u Srbiji. Poređenja između načina rada i studiranja, kvaliteta naučnog rada, posebno kvaliteta doktorskih studija predmet su čestih razmatranja i u profesionalnom i u javnom okruženju. Najveći izazov za privatne visokoškolske institucije je njihovo finansiranje, jer su uplate školarine od strane stude nata preovlađujući izvor sredstava za finansiranje njihovog rada. Broj studenata i visina školarine dominantno utiču i na broj nastavnika, prosečnu opterećenost nastavnika časo vima nastave i njihove zarade. Visokoškolske ustanove u državnom vlasništvu uglavnom se finansiraju iz državnog budžeta. Najveći deo ovih sredstava opredeljuje se iz budžeta za prosvetu. Kao naučne ustanove, univerziteti i fakulteti dobijaju i deo sredstava iz budžeta za nauku, indirektno, putem projektnog finansiranja. Značajan deo sredstava potiče i od školarina koje plaćaju studenti koji nisu ispunili uslov za studiranje na teret budžeta.

Cilj ovog rada je da sagleda visinu i strukturu izvora sredstava za finansiranje ustanova visokoškolskog obrazovanja u javnom vlasništvu Republike Srbije i strukturu i efikasnost upotrebe tih sredstava u 2023. i 2024. godini.

METODOLOGIJA

Istraživanjem su obuhvaćene visokoobrazovne ustanove u javnom vlasništvu. Visoko-obrazovne ustanove u privatnom vlasništvu pominju se u meri u kojoj omogućuju bolje sagledavanja značaja visokoobrazovnih ustanova u javnom vlasništvu.

Istraživanje obuhvata sve javne visokoškolske ustanove u Republici Srbiji. Potrebni podaci pribavljeni su iz zvaničnih izvora sa sajta Ministarstva finansija, Ministarstva prosvete, Republičkog zavoda za statistiku, Pokrajinskog sekretarijata za finansije Autonomne pokrajine Vojvodine (APV) i Filozofskog fakulteta u Univerziteta u Beogradu. Svi izvori podataka javno su dostupni.

Pribavljeni podaci sistematizovani su po visokoškolskim ustanovama tako da se ukupni izvori finansiranja mogu grupisati po namenama. Sistematizovani podaci prikazani su celovito u nekoliko tabela. Raspoloživi podaci pružili su mogućnost kreiranja nekoliko jednostavnih pokazatelja rezultata raspodele. Postoje minimalne razliku u broju studenata koje su objavili Republički zavod za statistiku i Ministarstvo prosvete. Ove razlike su prirodne, jer se broj studenata učestalo menja (upisi nekih studijskih programa počinju kasnije, studenti prelaze s jedne na drugu ustanovu u toku školske

godine, diplomiraju ili napuštaju studije, i slično). Navedene razlike nemaju uticaja na rezultate ovog istraživanja. Pored toga, podaci na sajtu Ministarstva prosvete uključuju i podatke za Univerzitet u Prištini. Podaci Republičkog zavoda za statistiku ne uključuju ove podatke.

Druga razlika odnosi se na izvore finansijskih podataka. Podaci iz budžeta za 2023. godinu su konačni, dok budžet za 2024. godinu još uvek nije konačno usvojen. Nismo u mogućnosti da ocenimo visinu odstupanja između prikazanih i konačnih podataka i u tom smislu sve finansijske podatke za 2024. godinu treba posmatrati kao indikativne podatke.

Pri analizi podataka treba imati u vidu da se budžet usvaja za kalendarsku godinu, dok se dinamika promena broja studenata odvija na nivou školske godine (1. oktobar – 30. septembar).

NALAZ I DISKUSIJA

Prema podacima sa sajta Ministarstva prosvete (7), u Srbiji danas posluje 23 univerziteta, koji obuhvataju 187 visokoškolskih ustanova, od kojih je 63% u javnom vlasništvu, a 37% u privatnom vlasništvu. Na fakultetima danas studira 250.668 studenata, od kojih 87% na javnim visokoškolskim ustanovama, a 13% na privatnim visokoškolskim ustanovama.

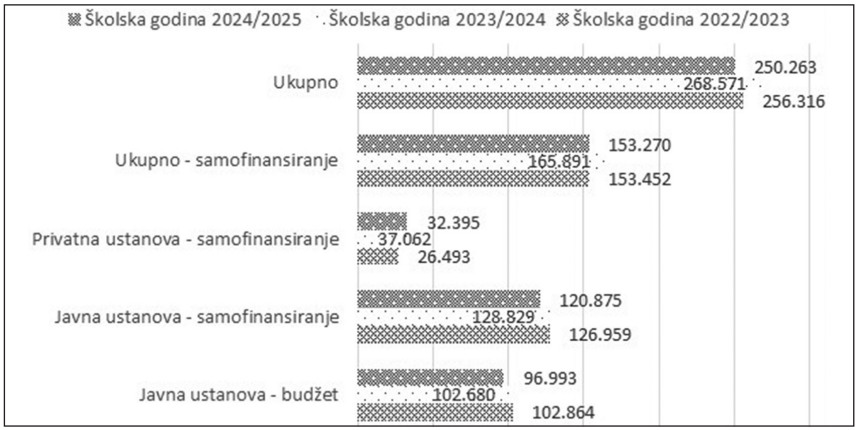
Tabela 1: Broj i struktura visokoškolskih ustanova u Srbiji u školskoj 2024/2025 godini

		Broj ustanova			Broj studenata		
		Ukupno	U tome:		Ukupno	U tome:	
Ustanova	Broj univerziteta		Fakulteti	VŠ/ASS*		Fakulteti	VŠ/ASS*
Javna ustanova	9	117	95	22	217.848	187.985	29.863
Privatna ustanova	14	70	46	24	32.395	24.631	7.764
Ukupno	23	187	141	46	250.243	212.616	37.627
STRUKTURA							
Javna ustanova	39%	63%	67%	48%	87%	88%	79%
Privatna ustanova	61%	37%	33%	52%	13%	12%	21%
Ukupno	100%	100%	100%	100%	100%	100%	100%
Prosečan broj studenata po visokoškolskoj ustanovi							
Javna ustanova					1.862	1.979	1.357
Privatna ustanova					463	535	324
Ukupno					1.338	1.508	818

* Visoke škole/Akademije strukovnih studija

Izvor: Autori, broj ustanova prema (7).

Prema Zakonu o visokom obrazovanju, delatnost visokog obrazovanja obavljaju univerziteti, fakulteti, odnosno umetničke akademije u sastavu univerziteta, akademije strukovnih studija, visoke škole i visoke škole strukovnih studija. Visokoškolska ustanova obavlja naučnoistraživačku, umetničku, ekspertsko-konsultantsku i izdavačku delatnost. (1)



Grafik 1: Trend broja upisanih studenata
u 2022/2023, 2023/2024 i 2024/2025 školskoj godini

Izvor: Autori, prema (7)

VISOKOŠKOLSKE USTANOVE KOJE SE FINANSIRAJU IZ BUDŽETA

Prema podacima na sajtu Ministarstva prosvete, u školskoj 2023/2024 godini u Srbiji je studiralo 268.571 studenata. Na teret državnog budžeta finansirano je oko 44% studenata koji studiraju na javnim visokoškolskim ustanovama, dok je veći deo, oko 56% studenata, samostalno plaćalo školarinu. Udeo zbira samofinansirajućih studenata i na javnim i na privatnim visokoškolskim ustanovama koji plaćaju školarinu iznosi oko 62%. Detaljnija struktura finansiranja data je u tabeli 2.

Prema podacima Republičkog zavoda za statistiku (2024), u školskoj 2023/2024 godini, u Srbiji je studiralo 249.768 studenata. Na teret državnog budžeta studiralo je 96.681 studenata (39%), a broj samofinansirajućih studenata na javnim ustanovama bio je 111.542 studenata. Ukupan broj samofinansirajućih studenata na javnim i privatnim visokoškolskim ustanovama iznosi 153.087 (61%).

Posmatrano prema vrsti visokoškolkih ustanova, udeo studenata na budžetu na univerzitetima iznosi 47%, i za oko deset odsto je veći od udela studenata na budžetu na visokim školama/akademijama (42%).

Nastavno osoblje visokoškolske ustanove su nastavnici (predavači i viši predavači i docenti i vanredni i redovni profesori), istraživači i saradnici (asistenti i asistenti sa doktoratom), koji ostvaruju obrazovnu, naučnu, umetničku, istraživačku i inovacionu delatnost. Pored nastavnog, visokoškolske ustanove imaju i nenastavno osoblje, koje obavljaju stručne, administrativne i tehničke poslove. Prema podacima Republičkog zavoda za statistiku (6), u školskoj 2023/2024 godini, na visokoškolskim ustanovama u Srbiji bilo je 12.495 nastavnika i saradnika, od toga 9.295 nastavnika. Na univerzitetima je bilo angažovano 95% nastavnika (80% ustanova i 84% broja studenata) i saradnika, a na

visokim školama i akademija preostalih 5% nastavnika i saradnika (20% ustanova i 16% broja studenata).

Nepokretnosti i druga sredstva za osnivanje i rad visokoškolske ustanove koja obezbeđuje država, u državnoj su svojini.

Tabela 2: Način finansiranja visokog obrazovanja u Srbiji

(U dinarima)	Školska godina		
Svojinski oblik ustanove	2022/2023	2023/2024	2024/2025
Javna ustanova - budžet	102.864	102.680	96.993
Javna ustanova - samofinansiranje	126.959	128.829	120.875
Privatna ustanova - samofinansiranje	26.493	37.062	32.395
Ukupno - samofinansiranje	153.452	165.891	153.270
Ukupno	256.316	268.571	250.263
U tome:			
Univerzitet u Prištini	*	*	*
Javna ustanova - budžet	3.272	2.959	2.353
Javna ustanova - samofinansiranje	2.330	2.200	1.827
Ukupno	5.602	5.159	4.180
Udeo studenata na budžetu na javnim ustanovama	45%	44%	45%
Udeo samofinansirajućih studenata na javnim ustanovama	55%	56%	55%
Studenti na budžetu / Ukupan broj studenata	40%	38%	39%
Samofinansirajući studenti / Ukupan broj studenata	60%	62%	61%

Izvor: Autori, prema (7)

* Napomena: Podaci na sajtu Ministarstva prosvete uključuju i podatke za Univerzitet u Prištini. Podaci Republičkog zavoda za statistiku ne uključuju ove podatke.

Tabela 3: Način finansiranja troškova studiranja prema vrsti visokoškolskih ustanova u školskoj 2023/2024 godini

Ustanova	Broj univerziteta i visokih škola/ akademija	Broj ustanova u okviru univerziteta	Broj studenata	U tome:		Udeo studenata na budžetu
				Budžet	Samo-finansiranja	
Univerziteti	9	82	175.655	82.886	92.769	47%
Visoke škole/akademije	22	22	32.528	13.795	18.773	42%
Ukupno	31	104	208.183	96.681	111.542	46%
STRUKTURA						
Univerziteti		79%	84%	86%	83%	
Visoke škole/akademije		21%	16%	14%	17%	
Ukupno		100%	100%	100%	100%	

Izvor: Autori, prema (6)

* Napomena: RZS ne uključuju u svoje podatke Univerzitet u Prištini. Ministarstvo prosvete na svom sajtu uključuje i Univerzitet u Prištini i prikazuje 10 univerziteta.

Tabela 4: Nastavnici i saradnici na visokoškolskim ustanovama u Srbiji u školskoj 2023/2024 godini

Ustanova	Broj univerziteta i visokih škola/ akademija	Broj ustanova u okviru univerziteta i visokih škola/ akademija	Broj nastavnog osoblja	U tome:	
				Nastavnici	Saradnici
Univerziteti	9	82	8.635	7.335	2.000
Visoke škole/akademije	22	21	576	487	89
Ukupno	31	103	9.211	7.822	2.089
STRUKTURA					
Univerziteti		80%	94%	94%	96%
Visoke škole/akademije		20%	6%	6%	4%
Ukupno		100%	100%	100%	100%

Izvor: Autori, prema (6)

FINANSIRANJE VISOKOŠKOLSKIH USTANOVA IZ BUDŽETA

U ovom delu prvo ćemo da sagledamo iznose sredstava koji se za potrebe visokog obrazovanja izdvajaju iz budžeta. Zatim ćemo da sagledamo strukturu izvora tih sredstava. Na kraju ćemo detaljno razmotriti raspodelu sredstava po univerzitetima. Informacije za ovu analizu pribavljene su iz Zakona o završnom računu budžeta Republike Srbije za 2023. godinu, u kome su navedeni realizovani iznosi, i Zakona o budžetu Republike Srbije, u kome su navedeni planirani iznosi[1].

Iz ukupnog budžeta Republike Srbije (RS), u prethodne dve godine, za namene koje su u nadležnosti Ministarstva prosvete, izdvaja se nešto više od 10 posto budžetskih sredstava. Oko jedne petine izdvojenih sredstava namenjuje se za potrebe finansiranja visokog obrazovanja.

Dva najznačajnija izvora iz kojih se formiraju sredstva u budžetu su budžetski prihodi, koji čine oko dve trećine izvora sredstava, i sopstveni prihodi budžetskih korisnika, koji čine oko jedne trećine izvora sredstava. U 2023. godini, iz budžetskih prihoda formirano je 39.105 miliona dinara (63%), a iz sopstvenih sredstava ustanova visokog obrazovanja 19.010 miliona dinara (31%). U 2024. godini, iz budžetskih prihoda formirano je 43.832 miliona dinara (69%), a iz sopstvenih sredstava ustanova visokog obrazovanja 19.640 miliona dinara (31%). U izveštaju o budžetu nema informacija o vrsti ili načinu sticanja sopstvenih prihoda visoko obrazovnih ustanova, kao ni da li se ti prihodi formiraju ravnomerno po svim ustanovama, ili na neki drugi način. Potencijalni izvori ovih prihoda su školarine od studenata koji sami plaćaju svoju školarinu i prihodi od naučnih projekata i drugih sličnih aktivnosti. Prema Zakonu o visokom obrazovanju, rezultati naučnog, umetničkog i istraživačkog rada mogu se komercijalizovati, ako se tim poslovima ne ugrožava kvalitet nastave i naučnog rada. Pitanje načina formiranja ovih prihoda važno je da bi se znala metodologija po kojoj se sredstva raspodeljuju na sve visokoškolske ustanove.

[1] Proces usvajanja konačnog budžeta još uvek nije završen.

Na teret budžeta Ministarstva prosvete finansira se poslovanje osam univerziteta (detalji su prikazani u Tabeli 5), poslovanje akademija i visokih škola. Pored toga, deo sredstava služi za finansiranje aktivnosti opšte namene, kao što je podrška master ili doktorskim studijama.

Univerzitet odbrane i Kriminalističko-policijski univerzitet ne finansiraju se iz budžeta Ministarstva prosvete. Za Kriminalističko-policijski univerzitet izdvajaju se sredstva iz budžeta Ministarstva unutrašnjih poslova (Razdeo 15.1 Kriminalističko-policijski univerzitet). O sredstvima namenjenim za finansiranje Univerziteta odbrane nema podataka u okviru budžeta Ministarstva odbrane.

Tabela 5: Formiranje i upotreba sredstava za finansiranje visokog obrazovanja iz budžeta Republike Srbije (u dinarima)

	2023		2024	
	Zakon o završnom računu budžeta Republike Srbije za 2023. g.	Struktura	Zakon o budžetu Republike Srbije za 2024. g.	Struktura
Budžet Republike Srbije	2.668.817.573.616	100%	2.940.873.800.000	100%
Ministarstvo prosvete	282.887.792.224	11%	314.192.950.000	11%
VIŠE I UNIVERZITETSKO OBRAZOVANJE	61.675.430.956	2%	63.472.882.000	2%
IZVORI FINANSIRANJA				
PRIHODI				
Opšti prihodi i primanja budžeta	39.105.837.620	63%	43.832.265.000	69%
Sopstveni prihodi budžetskih korisnika	19.010.320.000	31%	19.640.617.000	31%
Donacije od inostranih zemalja	218.849.000	0%	-	0%
Donacije od međunarodnih organizacija	1.893.916.000	3%	-	0%
Transferi od drugih nivoa vlasti	1.061.044.000	2%	-	0%
Dobrovoljni transferi od fizičkih i pravnih lica	147.702.000	0%	-	0%
Primanja od inostranih zaduženja	226.432.336	0%	-	0%
Finansijska pomoć EU	11.330.000	0%	-	0%
Ukupno	**61.675.430.956**	**100%**	**63.472.882.000**	**100%**
RASHODI				
Modernizacija infrastrukture ustanova visokog obrazovanja	398.754.049	1%	212.000.000	0%
Podrška radu Univerzita u Beogradu	36.066.671.996	58%	25.873.624.000	41%
Podrška radu Univerziteta u Novom Sadu	8.124.693.239	13%	10.816.427.000	17%
Podrška radu Univerziteta u Kragujevcu	3.284.071.076	5%	4.705.580.000	7%
Podrška radu Univerziteta u Nišu	4.152.473.200	7%	6.853.767.000	11%
Podrška radu Univerziteta u Prištini sa privremenim sedištem u Kosovskoj Mitrovici	3.143.328.060	5%	3.826.465.000	6%
Podrška radu Državnog univerziteta u Novom Pazaru	585.434.686	1%	662.025.000	1%
Podrška radu Univerziteta umetnosti	1.672.881.822	3%	2.048.387.000	3%
Podrška radu visokih škola	4.015.680.119	7%	8.200.909.000	13%
Podrška otvorenosti visokog obrazovanja	43.970.534	0%	62.549.000	0%
Podrška realizaciji doktorskih studija	170.012.173	0%	169.001.000	0%
Razvoj visokog obrazovanja	3.000.000	0%	33.100.000	0%
Podrška realizaciji master studija na univerzitetima	14.460.000	0%	9.048.000	0%
Ukupno	**61.675.430.954**	**100%**	**63.472.882.000**	**100%**

Izvor: Autori, na osnovu (4) i (2).

Visokoškolske ustanove na teritoriji Autonomne pokrajine Vojvodine (APV) neposredno se finansiraju iz budžeta APV. Sredstva za finansiranje zarada obezbeđuju se iz budžeta RS i transferišu u budžet APV. Sredstva za ostale troškove obezbeđuju se neposredno iz budžeta APV.

Ukupna sredstva za finansiranje visokog obrazovanja čine sredstva iz budžeta Ministarstva prosvete RS, sredstva iz budžeta Pokrajinskog sekretarijata za visoko obrazovanje i naučnoistraživačku delatnost, deo budžeta Ministarstva unutrašnjih poslova za Kriminalističko policijski univerzitet, deo sredstava Ministarstva odbrane za Univerzitet odbrane i deo sredstava Ministarstva nauke, tehnološkog razvoja i inovacija, kao što je prikazano u tabeli 7.

Tabela 6: Izdvajanja iz budžeta APV za finansiranje funkcije visokog obrazovanja

(U dinarima)	Odluka o završnom računu budžeta AP Vojvodine za 2023. godinu.	Odluka o rebalansu računa budžeta AP Vojvodine za 2024. g.
Budžet APV Pokrajinski sekretarijat za obrazovanje		
Podrška radu visokoobrazovnih ustanova	9.008.253.585	10.561.319.622
Modernizacija infrastrukture visokog obrazovanja	241.546.934	54.389.980
Ukupno	9.249.800.520	10.615.709.602
U tome:		
Transfer iz budžeta RS u budžet APV	8.124.693.239	9.277.623.000
Neto izdvajanja iz budžeta APV	1.125.107.281	1.338.086.602

Izvor: Autori, prema (8) i (9)

Napomena: Sredstva za plate, dodatke i naknade zaposlenih (zarade) i socijalne doprinose na teret poslodavca prenose se iz budžeta RS u budžet APV kao transferna sredstva za zaposlene u ustanovama visokog obrazovanja u AP Vojvodini. (5, 228-229)

Tabela 7: Ukupan iznos sredstava koji se iz budžeta izdvaja za visoko obrazovanje

(U dinarima)	2023		2024	
Budžet Ministarstva prosvete RS	61.675.430.954		63.472.882.000	
Budžet APV - bez transfera od RS	1.125.107.281		1.338.086.602	
Budžet Ministarstva unutrašnjih poslova - deo za Kriminalističko policijski univerzitet	675.268.176		668.061.000	
Budžet Ministarstva odbrane - deo za Univerzitet odbrane	Nema podataka	%	Nema podataka	%
Ukupno za visokoobrazovne ustanove	63.475.806.411	85	65.479.029.602	83
Studentski standard iz budžeta RS	11.340.326.149	15	13.228.814.000	17
UKUPNO	74.816.132.560	100	78.707.843.602	100

Ministarstvo nauke, tehnološkog razvoja i inovacija	33.991.384.078	36.512.125.000
U tome: deo za projekte na visokoškolskim ustanovama	Nema podataka	Nema podataka

Izvor: Autori.

Tabela 8: Upotreba sredstava iz budžeta po namenama (u dinarima)

Konsolidovani rashodi za finansiranje visokog obrazovanja u Republici Srbiji (budžet Republike Srbije i budžet Autonomne pokrajine Vojvodine)	2023. (odluka)	Struktura	2024. (plan)	Struktura	Promena 2024 minus 2023	Stopa rasta 2024/2023
Neposredno finansiranje iz budžeta RS						
Plate, dodaci i naknade zaposlenih (zarade)	31.929.416.045		35.783.649.000			
Socijalni doprinosi na teret poslodavca	4.804.603.643		5.483.205.000			
Naknade u naturi	89.768.838		64.887.000			
Socijalna davanja zaposlenima	299.785.124		266.978.000			
Naknade troškova za zaposlene	529.012.184		413.900.000			
Nagrade zaposlenima i ostali posebni rashodi	226.866.887		155.669.000			
Posredno finansiranje prenosom u budžet APV						
Transfer iz Budžeta RS u budžet APV za zarade i poreze na zarade na teret poslodavca	8.124.693.239		9.277.623.000			
UKUPNO ZARADE I NAKNADE ZARADA	46.004.145.960	72%	51.445.911.000	79%	5.441.765.040	12%
Troškovi poslovanja iz budžeta APV	883.560.344		1.283.696.622			
Neposredno finansiranje iz budžeta RS						
Stalni troškovi iz budžeta	2.128.682.550		1.881.747.000			
Troškovi putovanja	1.065.654.478		590.845.000			
Usluge po ugovoru	5.317.741.247		3.587.032.000			
Specijalizovane usluge	2.173.221.676		1.673.803.000			
Tekuće popravke i održavanje	621.560.798		592.655.000			
Materijal	1.238.229.075		1.152.617.000			
Amortizacija nekretnine i opreme	11.318.000		-			
UKUPNO TROŠKOVI POSLOVANJA	13.439.968.168	21%	10.762.395.622	16%	-2.677.572.546	-20%
Otplata domaćih kamata	2.148.000		80.438.000			
Prateći troškovi zaduživanja	10.105.000		7.187.000			
Dotacije međunarodnim organizacijama	7.672.000		875.000			
Transferi ostalim nivoima vlasti	758.934.285		913.795.000			
Ostale dotacije i transferi	387.875.000		2.060.000			
Naknade za socijalnu zaštitu iz budžeta	127.824.000		27.092.000			
Dotacije nevladinim organizacijama	14.451.000		10.186.000			
Porezi, obaveze, takse, kazne, penali i kamate	39.804.309		43.433.000			
Novčane kazne i penali po rešenju sudova	11.482.000		7.731.000			
Naknada štete za povrede na radu ili drugih prirodnih uzorka	-		1.160.000			
Naknada štete za povrede ili štetu nanetu od strane državnih organa	27.126.000		16.500.000			
Zgrade i građevinski objekti	546.708.738		498.119.000			
Mašine i oprema	1.041.789.357		943.139.000			
Ostale nekretnine i oprema	-		10.144.000			
Kultivisana imovina	3.207.000		9.232.000			
Nematerijalna imovina	68.187.905		91.558.000			
Zalihe proizvodnje	-		19.640.000			
Zalihe robe za dalju prodaju	112.634.000		48.346.000			
UKUPNO DRUGI TROŠKOVI	3.159.948.594	5%	2.730.635.000	4%	- 429.313.594	-14%
RASPOREĐENO PO UNIVERZITETIMA	62.604.062.722	99%	64.938.941.622	99%	2.334.878.900	4%
ZAJEDNIČKE NAMENE	231.442.707		273.698.000			
MODERNIZACIJA INFRASTRUKTURE VISOKOG OBRAZOVANJA	640.300.983		266.389.980			
UKUPNO	63.475.806.412	100%	65.479.029.602	100%	2.003.223.190	3%

Izvor: Autori, prema (4), (2), (8, i (9).

Tabela 9: Promene u strukturi finansiranja univerzitate u 2024. godini u odnosu na 2023. godinu

	Promene 2024. minus 2023.			
Univerzitet	Ukupno	Promene na zaradama 2024-2023	Promena na troškovima poslovanja	Promene na drugim troškovima
Univerzitet u Beogradu	-10.193.047.997	-2.676.326.497	-6.138.315.500	-1.378.406.000
Univerzitet u Kragujevcu	1.421.508.924	670.963.019	587.108.905	163.437.000
Univerzitet u Nišu	2.701.293.800	1.170.520.517	1.223.042.283	307.731.000
Univerzitet u Prištini sa privremenim sedištem u Kosovskoj Mitrovici	683.136.939	467.512.845	152.433.094	63.191.000
Podrška radu Državnog univerziteta u Novom Pazaru	76.590.314	61.118.242	14.409.072	1.063.000
Podrška radu Univerziteta umetnosti	375.505.177	229.369.920	125.749.257	20.386.000
Podrška radu visokih škola	4.185.228.880	2.789.193.326	955.605.839	440.429.715
Kriminalističko-policijski univerzitet	- 7.207.176	37.679.907	2.258.226	- 47.145.309
Univerzitet odbrane	-	-	-	-
Podrška visokom obrazovanju u Vojvodini (Novosadski univerzitet)	1.311.519.103	37.679.907	400.136.278	-
Zajedničke namene	- 630.196.756	-	-	-
Ukupno	1.463.135.210	5.441.765.040	-2.677.572.546	- 429.313.594

Izvori: Autori.

Ukupan iznos sredstava izdvojen za visoko obrazovanje iz budžeta RS i budžeta APV iznosi najmanje 63.475 miliona dinara u 2023. godini i 65.479 miliona dinara u 2024. godini. Pored toga, izdvajanja za studentski standard iznose 11.340 miliona dinara u 2023. i 13.228 miliona dinara u 2024. godini. Univerziteti i fakulteti su ne samo obrazovne, već i naučne institucije. Deo sredstava za razvoj naučne delatnosti priliva se i u visokoobrazovane institucije.

U 2023. godini, za potrebe visokog obrazovanja utrošeno je 63.475 miliona dinara. Projektovana potrošnja za 2024. godinu iznosi 65.479 miliona dinara, što je za 2.344 miliona (oko 3%) više nego prethodne godine. Najveći deo sredstava, 72% u 2023. godini i 79% u 2024. godini, namenjen je za isplatu zarada. U odnosu na 2023. godinu, u 2024. godini zarade su povećane za 5.442 miliona dinara. Za pokriće redovnih troškova poslovanja upotrebljen je 21% realizovanih sredstava u 2023. godini i 16% projektovanih sredstava u 2024. godini. Ukupna sredstva za ove namene u 2024. godini manja su za 2.678 miliona dinara (oko 20%) od iznosa istih u 2023. godini. Promene na budžetskim stavkama pokazuju da je za povećanje zarada u 2024. godini finansirano ne samo celokupnim povećanjem budžeta za visoko obrazovanje, već i smanjenjem ukupnih troškove poslovanja i smanjenjem drugih rashoda.

Posmatrano po pojedinačnim univerzitetima, uočava se veliko smanjenje iznosa za finansiranje rashoda Univerziteta u Beogradu. Iznosi namenjeni za finansiranje zarada na ovom univerzitetu umanjeni su za preko 2.676 milion dinara, iznosi namenjeni za

finansiranje troškova poslovanja umanjeni su za preko 6.138 miliona dinara, iznosi namenjeni za finansiranje drugih troškova umanjeni su za preko 1.378 miliona dinara. Ukupno umanjenje iznosa za finansiranje Beogradskoj univerziteta iznosi preko 10.193 miliona dinara. Za razliku od Beogradskog univerziteta, izdvajanja iz budžeta za finansiranje rashoda skoro svih drugih univerziteta su povećana. Detaljne promene u iznosima finansiranja u 2024. u odnosu na 2023. godinu prikazane su u tabeli 9.

Struktura rashoda za finansiranje visokoškolskih ustanova po univerzitetima data je u tabeli 10.

POKAZATELJI EFIKASNOSTI UPOTREBE SREDSTAVA IZ BUDŽETA

Raspoloživi podaci ne pružaju mogućnost za celovito sagledavanje efikasnosti korišćenja državnog budžeta od strane visokoškolskih ustanova u vlasništvu države. Za potrebe analize efikasnosti upotrebe budžetskih sredstava kao moguće pokazatelje prepoznali smo prosečan iznos budžeta po studentu, prosečan iznos budžeta po budžetskom studentu i prosečan iznos budžeta po nastavniku. Podaci o broju nastavnika i studenata preuzeti su iz publikacije Republičkog zavoda za statistiku „Visoko obrazovanje 2023/2024“ (6), za koje procenjujemo da su najmerodavnija osnovica za obračune efikasnosti, s obzirom da se školska i kalendarska godina razlikuju. Broj studenata za Univerzitet u Prištini sa privremenim sedištem u Kosovskoj Mitrovici uzet je sa sajta Ministarstva finansija.

Za osnovni element pokazatelja efikasnosti izabran je iznos iz budžeta. Budžet je u velikoj meri određen eksternim činiocima i stoga je ograničen, a osnovna struktura namenske raspodele relativno je stabilna. Povećanje izdavanja iz budžeta za jednu namenu neminovno iziskuje smanjenje iznosa za finansiranje neke druge namene.

Na nivou Republike Srbije, prosečna visina budžeta po studentu u 2023. godini iznosi 293.443 dinara, a u 2024. godini veći je za 3.7% i iznosi 304.387 dinara. Iako ovaj pokazatelj nije najmerodavniji za ocenu efikasnosti upotrebe budžeta, smatramo ga važnim, jer se iz budžeta finansira celokupna infrastruktura i logistika za odvijanje nastave, kako za budžetske, tako i za vanbudžetske studente. Bolji pokazatelj efikasnosti upotrebe budžeta su prosečan budžet po budžetskom studentu i prosečan budžet po nastavniku. Prosečna budžet po budžetskom studentu u 2023. godini iznosi 628.303 dinara, a u 2024. godini 651.736 dinara. Prosečan budžet po budžetskom studentu značajno varira između univerziteta i visokih škola. Najniže iznose ostvaruje Univerzitet u Novom Sadu, a najviši Kriminalističko-policijski univerzitet. Pokazatelj prosečnog budžeta po nastavniku u 2023. godini iznosi 8,0 miliona dinara, a u 2024. godini 8,3 miliona dinara. Najveću vrednost ovog pokazatelja imaju visoke škole, 8,2 miliona dinara u 2023. i 16,8 miliona dinara u 2024. godini. Beogradski univerzitet i Kriminalističko policijski univerzitet takođe ostvaruju preko 9 miliona dinara budžeta po nastavniku u 2023. godini. U 2024. godini, više od 9 miliona dinara ima samo Kriminalističko policijski univerzitet. Detaljan prikaz navedenih pokazatelja, po univerzitetima i visokim školama/ akademijama dat je u tabeli 11.

Tabela 10: Struktura upotrebe budžetskih sredstava po univerzitetima i visokim školama u 2023. i 2024. godini

2023	Budžet Republike Srbije Razdeo 26.4 Više i visoko obrazovanje (*)								Budžet Ministarstva unutrašnjih poslova Razdeo 15.1 Kriminalističko-policijski univerzitet	Budžet Ministarstva odbrane Razdeo 19	Budžet APV Program 2005 Visoko obrazovanje	Neraspoređeni delovi Budžeta Republike Srbije i Budžeta AP Vojvodine	
Šifra programa	0004	0005	0006	0007	0008	0009	0010	0011			2005		
Univerzitet	Univerzit u Beogradu	Univerzitet u Novom Sadu	Univerzitet u Kragujevcu	Univerzitet u Nišu	Univerzitet u Prištini sa privremenim sedištem u Kosovskoj Mitrovici	Podrška radu Državnog univerziteta u Novom Pazaru	Podrška radu Univerziteta umetnosti	Podrška radu visokih škola	Kriminalističko-policijski univerzitet	Univerzitet odbrane	Podrška visokom obrazovanju u Vojvodini (uključuje i transfer iz budžeta RS)	Zajedničke namene	Ukupno
Redni broj kolone	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(14)
ZARADE I NAKNADE ZARADA	21.843.313.497	8.124.693.239	3.163.480.981	4.029.388.483	3.085.187.155	547.471.758	1.578.235.080	3.151.929.674	480.446.093	-	8.124.693.239	-	46.004.145.960
TROŠKOVI POSLOVANJA	11.869.840.500	-	120.590.095	123.084.717	58.140.906	37.962.928	94.646.743	125.565.161	126.576.774	-	883.560.344	-	13.439.968.168
DRUGI TROŠKOVI	2.353.518.000	-	-	-	-	-	-	738.185.285	68.245.309	-	-	-	3.159.948.594
RASPOREĐENO PO UNIVERZITETIMA	36.066.671.997	8.124.693.239	3.284.071.076	4.152.473.200	3.143.328.061	585.434.686	1.672.881.823	4.015.680.120	675.268.176	-	9.008.253.585	-	62.604.062.722
ZAJEDNIČKE NAMENE	-	-	-	-	-	-	-	-	-	-	-	231.442.707	231.442.707
MODERNIZACIJA INFRASTRUKTURE VISOKOG OBRAZOVANJA		-	-	-	-	-	-	-	-	-	-	231.442.707	231.442.707
UKUPNO	36.066.671.997	8.124.693.239	3.284.071.076	4.152.473.200	3.143.328.061	585.434.686	1.672.881.823	4.015.680.120	675.268.176	-	9.249.800.519	630.196.756	63.475.806.412

2024	Budžet Republike Srbije Razdeo 26.4 Više i visoko obrazovanje (*)								Budžet Ministarstva unutrašnjih poslova Razdeo 15.1 Kriminalističko-policijski univerzitet	Budžet Ministarstva odbrane Razdeo 19	Podrška visokom obrazovanju u Vojvodini (uključuje i transfer iz budžeta RS)	Neraspoređeni delovi Budžeta Republike Srbije i Budžeta AP Vojvodine	
Šifra programa	0004	0005	0006	0007	0008	0009	0010	0011			2.005		
Univerzitet	Univerzit u Beogradu	Univerzitet u Novom Sadu	Univerzitet u Kragujevcu	Univerzitet u Nišu	Univerzitet u Prištini sa privremenim sedištem u Kosovskoj Mitrovici	Podrška radu Državnog univerziteta u Novom Pazaru	Podrška radu Univerziteta umetnosti	Podrška radu visokih škola	Kriminalističko-policijski univerzitet	Univerzitet odbrane	Podrška visokom obrazovanju u Vojvodini (uključuje i transfer iz budžeta RS)	Zajedničke namene	Ukupno
Redni broj kolone	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(14)
ZARADE I NAKNADE ZARADA	19.166.987.000	1.538.804.000	3.834.444.000	5.199.909.000	3.552.700.000	608.590.000	1.807.605.000	5.941.123.000	518.126.000	-	9.277.623.000	-	51.445.911.000
TROŠKOVI POSLOVANJA	5.731.525.000	-	707.699.000	1.346.127.000	210.574.000	52.372.000	220.396.000	1.081.171.000	128.835.000	-	1.283.696.622	-	10.762.395.622
DRUGI TROŠKOVI	975.112.000	9.277.623.000	163.437.000	307.731.000	63.191.000	1.063.000	20.386.000	1.178.615.000	21.100.000	-	-	-	2.730.635.000
RASPOREĐENO PO UNIVERZITETIMA	25.873.624.000	10.816.427.000	4.705.580.000	6.853.767.000	3.826.465.000	662.025.000	2.048.387.000	8.200.909.000	668.061.000	-	10.561.319.622	-	64.938.941.622
ZAJEDNIČKE NAMENE	-	-	-	-	-	-	-	-	-	-	-	273.698.000	273.698.000
MODERNIZACIJA INFRASTRUKTURE VISOKOG OBRAZOVANJA	-	-	-	-	-	-	-	-	-	-	54.389.980	212.000.000	266.389.980
UKUPNO	25.873.624.000	10.816.427.000	4.705.580.000	6.853.767.000	3.826.465.000	662.025.000	2.048.387.000	8.200.909.000	668.061.000	-	10.615.709.602	485.698.000	65.479.029.602

Izvor: Autori, prema (2) (3), (4) i (8).

Tabela 11: Struktura i efikasnost upotrebe budžetskih sredstava

	Univerzit u Beogradu	Univerzitet u Kragujevcu	Univerzitet u Nišu	Univerzitet u Prištini sa privremenim sedištem u Kosovskoj Mitrovici	Podrška radu Državnog univerziteta u Novom Pazaru	Podrška radu Univerziteta umetnosti	Podrška radu visokih škola	Kriminalističko-policijski univerzitet	Univerzitet odbrane	Univerzitet u Novom Sadu	Ukupno
Budžet 2023	36.066.671.996	3.284.071.076	4.152.473.200	3.143.328.060	585.434.686	1.672.881.822	4.015.680.119	675.268.177	-	9.249.800.519	63.475.806.411
Budžet 2024	25.873.624.000	4.705.580.000	6.853.767.000	3.826.465.000	662.025.000	2.048.387.000	8.200.909.000	668.061.000	-	10.615.709.602	65.479.029.602
Budžet 2025	31.335.382.000	5.937.741.000	8.714.614.000	4.467.217.000	782.999.000	2.505.517.000	9.710.873.000	801.570.000		18.973.670.000	83.229.583.000
Povećanje budžeta za 2025. - studentski zahtev broj 4											12.010.000.000
Broj ustanova	32	13	14	11	1	5	22	1	1	15	114
Broj nastavnog osoblja	4.720	1.244	1.480	-	182	489	576	76	444	3.284	9.211
- Nastavnici	3.664	889	1.126	700	133	406	487	73	344	2.173	7.822
- Saradnici	1.056	355	354	-	49	83	89	3	100	1.111	2.089
Broj studenata	90.152	15.202	22.000	5.160	2.681	2.905	32.528	725	881	41.109	213.343
- Budžet	37.352	7.767	11.446	2.959	1.264	1.809	13.795	335	800	22.113	99.640
- Samofinansiranje	52.800	7.435	10.554	2.201	1.417	1.096	18.733	390	81	18.996	113.703
Pokazatelji za 2023											
Prosečan budžet po studentu	400.065	216.029	188.749	609.172	218.364	575.863	123.453	931.404	-	219.131	293.443
Prosečan budžet po budžetskom studentu	965.589	422.824	362.788	1.062.294	463.160	924.755	291.097	2.015.726	-	219.131	628.303
Prosečna budžet po nastavniku	9.843.524	3.694.118	3.687.809	4.490.469	4.401.765	4.120.399	8.245.750	9.250.249	-	4.145.538	8.003.588
Pokazatelji za 2024											
Prosečan budžet po studentu	287.000	309.537	311.535	741.563	246.932	705.125	252.118	921.463	-	256.910	304.387
Prosečan budžet po budžetskom studentu	692.697	605.843	598.791	1.293.162	523.754	1.132.331	594.484	1.994.212	-	477.607	651.736
Prosečna budžet po nastavniku	7.061.579	5.293.116	6.086.827	5.466.379	4.977.632	5.045.288	16.839.649	9.151.521	-	4.860.248	8.302.089
Indeks promene iznosa budžeta 2024/2023	72%	143%	165%	122%	113%	122%	204%	99%	0%	117%	104%
Indeks promene iznosa budžeta 2025/2024	121%	126%	127%	117%	118%	122%	118%	120%	0%	179%	127%

Izvor: Autori, prema (2), (3), (4)

ILUSTRACIJA FINANSIJSKOG POSLOVANJA USTANOVE VISOKOG OBRAZOVANJA U REPUBLICI SRBIJI

Radi sticanja celovitog uvida u finansijsko poslovanje ustanove visokog obrazovanja izabrali smo izveštaj o finansijskom poslovanju Filozofskog fakulteta Univerziteta u Beogradu. Izbor ovog izveštaja nije slučajan. Naime, veoma je teško naći detaljne informacije o finansijskom poslovanju na internet stranicama fakulteta. Ako ih i ima, najčešće su nepregledne (onlajn varijanta), sa nejasnim opisima, bez navođenja perioda na koji se odnosi, bez navođenja jedinice preciznosti za valutu u kojoj su iskazani, itd. dok se nigde ni ne pominju konsolidovani finansijski izveštaji na nivou univerziteta. Filozofski fakultet Univerziteta u Beogradu (dalje u tekstu: Fakultet) na svom vebsajtu objavio je veoma detaljne izveštaje o poslovanju, iz kojih se celovito može sagledati i finansijsko i nefinansijsko poslovanje.

Analiza prihoda koji su ostvareni u 2023. godini pokazuje da uporedo sa osnovnim prihodima koji potiču od Ministarstva prosvete u iznosu od 821.051.748 dinara, Fakultet ostvaruje sopstvene prihode u iznosu od 202.520.804 dinara i prihode namenjene za naučni rad u iznosu od 517.200.351 dinar. Mereno u odnosu na prihode od Ministarstva prosvete, dodatni prihodi dostiže 78% tih prihoda. Prihodi namenjeni za naučni rad najvećim delom potiču od Ministarstva nauke, tehnološkog razvoja i inovacija i Ministarstva kulture. Ukupni prihodi od svih ministarstava iznose 1.272.512.056 dinara, što je 1,6 puta veće od osnovnih prihoda od Ministarstva prosvete.

U okviru sopstvenih prihoda, najveći deo odnosi se na prihode od školarina u iznosu od 128.270.398 dinara koje plaćaju samofinansirajući studenti (104.760.057 dinara) i drugih naknada, kao što su naknade za prijemni ispit (12.060.123 dinara), ispitne prijave (6.851.479 dinara) i slično.

U okviru rashoda, najveći troškovi čine zarade i druge naknade zaposlenih, u iznosu od 1.248.383.774 dinara, što čini 81% ukupnih rashoda i izdataka.

Detaljniji prikaz prihoda, rashoda i izdataka dat je u tabeli 12.

Posmatrano sa stanovišta strukture najznačajnijih grupa prihoda, rashoda i izdataka vidi se da u strukturi prihoda najznačajniji udeo imaju prihodi od Ministarstva prosvete (53%), zatim prihodi za naučni rad (34%) i sopstveni prihodi (13%) ukupnih prihoda. U strukturi rashoda i izdataka, najznačajniji su troškovi zarada i naknada (81%). Drugi troškovi čine 19% rashoda, dok su ulaganja u opremu zanemarljiva. Sažeti prikaz prihoda, rashoda i izdataka dat je u tabeli 13.

Tabela 12: Struktura prihoda, rashoda i izdataka za 2023. godinu

Univerzitet u Beogradu Filozofski fakultet **Prihodi i rashodi, izdaci i finansijski rezultat za 2023. godinu** (u dinarima)			U tome od:		
	2022.	2023.	Ministarstvo prosvete	Sopstveni prihodi fakulteta	Namenska sredstva za naučni rad, izdavačku delatnost, međunarodnu saradnju i sl.
PRIHODI					
Ministarstvo prosvete	746.533.159	821.051.748	821.051.748	-	-
Ministarstvo nauke, tehnološkog razvoja i inovacija	409.044.815	451.460.308	-	37.638.790	413.821.518
Ministarstvo kulture	5.249.508	8.459.923	-	-	8.459.923
Donacije i ostali prihodi	35.499.595	27.657.275	-	2.391.287	25.265.988
Školarine i ostale uplate studenata	128.691.170	130.274.884	-	128.270.398	2.004.486
Izdavanje prostora	26.425.148	30.496.241	-	30.496.241	-
Prihodi za naučni rad	51.647.534	71.441.524	-	3.724.088	67.717.436
UKUPNI PRIHODI	**1.403.090.929**	**1.540.841.903**	**821.051.748**	**202.520.804**	**517.269.351**
Odnos drugih prihoda prema prihodima od Ministarstva prosvete			**100%**	**25%**	**63%**
RASHODI I IZDACI					
Zarade i naknade zaposlenima	1.140.226.763	1.248.383.774	812.576.738	134.618.306	301.188.730
Stalni troškovi	39.167.139	48.650.122	4.356.012	44.123.163	170.947
Troškovi putovanja	11.060.743	15.545.718	56.771	418.412	15.070.535
Usluge po ugovoru	92.338.946	92.357.306	729.984	15.775.702	75.851.620
Specijalizovane usluge	111.223.573	114.138.244	2.846.255	9.289.107	102.002.882
Tekuće popravke i održavanje	14.685.446	9.900.530	-	9.196.171	704.359
Materijal	6.801.274	8.753.579	485.988	6.101.400	2.166.191
Naknade za socijalnu zaštitu iz budžeta	24.000	25.000	-	25.000	-
Porezi, takse i kazne	183.612	360.001	-	21.691	338.310
UKUPNO TEKUĆI RASHODI	**1.415.711.496**	**1.538.114.274**	**821.051.748**	**219.568.952**	**497.493.574**
Administrativna oprema	3.139.757	3.034.760	-	1.173.472	1.861.288
Oprema za obrazovanje i nauku	9.001.334	4.286.264	-	72.641	4.213.623
Knjige u bibliotekama i softver	1.212.120	1.351.329	-	1.351.329	-
UKUPNO TEKUĆI IZDACI	13.353.211	8.672.353	-	2.597.442	6.074.911
UKUPNO RASHODI I IZDACI	**1.429.064.707**	**1.546.786.627**	**821.051.748**	**222.166.394**	**503.568.485**
REZULTAT	**- 25.973.778**	**- 5.944.724**	**-**	**- 19.645.590**	**13.700.866**

Izvor: Autori, prema (11).

Tabela 13: Sažet prikaz prihoda, rashoda i izdataka

Univerzitet u Beogradu Filozofski fakultet **Sažeti bilans prihoda, rashoda i izdataka** (u dinarima)	2023.	Procenat u odnosu na ukupne prihode
Prihodi		
Prihodi od Ministarstva prosvete	821.051.748	53%
Sopstveni prihodi od školarina i slično	202.520.804	13%
Prihodi za naučni rad	517.269.351	34%
Ukupni prihodi	**1.540.841.903**	**100%**
Rashodi i izdaci		
Zarade zaposlenih	1.248.383.774	81%
Drugi troškovi	289.730.500	19%
Ulaganja u opremu	8.672.353	1%
Ukupni rashodi	**1.546.786.627**	**100%**
GUBITAK	**- 5.944.724**	**0%**

Izvor: Autori.

ZAKLJUČNA RAZMATRANJA

Cilj ovog rada je da sagleda visinu i strukturu izvora sredstava za finansiranje visokoškolskog obrazovanja u Srbiji i strukturu i efikasnost upotrebe tih sredstava u 2023. i 2024. godine. Svi podaci korišćeni u ovom radu javno su dostupni.

Prema podacima Ministarstva prosvete, u školskoj 2023/2024 godini u Republici Srbiji studira 268,571 studenta, od toga 231.509 studenata (86%) na javnim i 37.062 studenata (14%) na privatnim ustanovama. Studiranje se odvija na 187 visokoškolskih ustanova, od toga 117 javnih i 70 privatnih (uključujući i Univerzitet u Prištini). Na budžetu Republike Srbije školuje se 102.680 studenata (38%), dok veći deo njih, 165.891 studenata (62%) plaća školarinu. Na univerzitetima je bilo angažovano 9.211 nastavnika, od toga 94% nastavnika i saradnika (80% ustanova i 84% broja studenata), a na visokim školama i akademija preostalih 6% nastavnika i saradnika (20% ustanova i 16% broja studenata).

Iz ukupnog budžeta Republike Srbije, u posmatranom periodu, za namene koje su u nadležnosti Ministarstva prosvete, izdvaja se nešto više od 10 posto budžetskih sredstava. Oko jedne petine izdvojenih sredstava namenjuje se za potrebe finansiranja visokog obrazovanja. Dva najznačajnija izvora iz kojih se formiraju sredstva u budžetu su budžetski prihodi, koji čine oko dve trećine izvora sredstava, i sopstveni prihodi budžetskih korisnika, koji čine oko jedne trećine izvora sredstava. U izveštaju o budžetu nema informacija o vrsti ili načinu sticanja sopstvenih prihoda visokoobrazovnih ustanova, kao ni da li se ti prihodi formiraju ravnomerno po svim ustanovama, ili na neki drugi način. Pored Ministarstva prosvete, i druga ministarstva dodeljuju visokoobrazovanim ustanovama finansijska sredstva za naučni rad. Raspoloživi podaci ne pružaju mogućnost za sagledavanje izdvajanja za te namene. Poslovanje dva univerziteta, Univerziteta odbrane i Kriminalističko policijskog univerziteta finansiraju se iz budžeta nadležnih ministarstava. Visokoškolske ustanove u Autonomnoj pokrajini Vojvodini (APV) finansiraju se iz budžeta APV, pri čemu se najveći deo izvora tih sredstava sliva transferom iz budžeta Republike Srbije u budžet APV.

Za ocenu efikasnosti utrošenih sredstava korišćena su tri pokazatelja: prosečna visina budžeta po studentu, prosečna visina budžeta po budžetskom studentu i prosečna visina budžeta po nastavniku.

Na nivou Republike Srbije, prosečna visina budžeta po studentu u 2023. godini iznosi 293.443 dinara, a u 2024. godini, 304.387 dinara. Iako ovaj pokazatelj nije najmerodavniji za ocenu efikasnosti upotrebe budžeta, smatramo ga važnim, jer se iz budžeta finansira celokupna infrastruktura i logistika za odvijanje nastave, kako za budžetske, tako i za vanbudžetske studente. Prosečna budžet po budžetskom studentu u 2023. godini iznosi 628.303 dinara, a u 2024. godini 651.736 dinara. Prosečan budžet po budžetskom studentu značajno varira između univerziteta i visokih škola. Najniže iznose ostvaruje Univerzitet u Novom Sadu, a najviši Kriminalističko-policijski univerzitet. Pokazatelj prosečnog budžeta po nastavniku u 2023. godini iznosi 8,0 miliona dinara, a u 2024. godini 8,3 miliona dinara. Najveću vrednost ovog pokazatelja imaju visoke škole, 8,2 miliona dinara u 2023. i 16,8 miliona dinara u 2024. godini. Beogradski univerzitet i Kriminalističko policijski univerzitet

takođe ostvaruju preko 9 miliona dinara budžeta po nastavniku u 2023. godini. U 2024. godini, više od 9 miliona dinara ima samo Kriminalističko policijski univerzitet. Svi ovi pokazatelji su indikativnog karaktera, jer za celovitu ocenu nedostaju narativna obrazloženja, odnosno opis metodologije na osnovu koje se formiraju iznosi u budžetu.

Za ilustraciju strukture finansiranja ustanove visokog obrazovanja uzet je primer Filozofskog fakulteta Beogradskog univerziteta. Izbor nije slučajan, jer je to jedan od retkih fakulteta koji na svom sajtu objavljuje detaljne informacije o svom finansijskom poslovanju. Finansijski izveštaji Filozofskog fakulteta pokazuju da 53% prihoda ostvarenih u 2023. godini potiče od Ministarstva prosvete, 13% prihoda su sopstveni prihodi (školarine, prijemni ispiti, prijave ispita, zakup i sl.), a 33% iz sredstava odobrenih za naučne projekte, najvećim delom od strane Ministarstva nauke, tehnološkog razvoja i inovacija.

Naše istraživanje ukazuje i na velike nedostatke u regulativi o izveštavanju o finansijskom poslovanju visokoškolskih ustanova. Prirodno je očekivati da visokoškolske ustanove, kao ustanove od javnog značaja, pregledno objavljuju detaljne podatke i informacije o planovima i rezultatima svog poslovanja. Ovo je pogotovo važno što skoro dve trećine studenata samostalno finansira svoje školovanje.

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Jozefina Beke-Trivunac[1]
Snežana Knežević[2]
Vesna Bogojević Arsić[3]

ORIGINAL RESEARCH PAPER
UDC 336.145:378(497.11)

Received: 15.02.2025.
Accepted: 15.03.2025.
Published: 31.03.2025.

Financing of Higher Education Institutions in the Public Sector of the Republic of Serbia

Summary: *This paper examines the financing of higher education institutions owned by the Republic of Serbia in 2023 and 2024. The aim of the paper is to comprehensively present the framework of funding sources and the earmarked use of these funds. The data used in this research were obtained from official sources, including the websites of the Ministry of Finance, the Ministry of Education, the Statistical Office of the Republic of Serbia, the Provincial Secretariat for Finance of the Autonomous Province of Vojvodina (APV), and the Faculty of Philosophy at the University of Belgrade. All data sources are publicly available. The collected data have been systematized according to higher education institutions so that total funding sources can be grouped by purpose. The available data enabled the creation of several simple indicators of allocation results. The financial reports of the Faculty of Philosophy at the University of Belgrade were used as an illustration of revenue sources and types of expenditures. The data indicate that 53% of the revenue generated in 2023 came from the Ministry of Education, 13% from self-generated income, and 33% from funds allocated for scientific projects, primarily from the Ministry of Science, Technological Development, and Innovation. The research also highlights significant deficiencies in regulations concerning financial reporting by higher education institutions. Given their public significance, higher education institutions should transparently publish data and information on their financial plans and outcomes. This is particularly important considering that nearly two-thirds of students finance their education independently.*

Keywords: *Public higher education, structure of financing of higher education institutions, efficiency of the use of funds for financing public higher education.*

[1] ALFA BK University, Serbia.
E-mail: jozefina.beke@alfa.edu.rs
ORCID iD: https://orcid.org/0000-0002-7394-7006

[2] University of Belgrade, Faculty of Organizational Sciences, Serbia.
E-mail: snezana.knezevic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0001-9833-7274

[3] University of Belgrade, Faculty of Organizational Sciences, Serbia.
E-mail: vesna.bogojevic.arsic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0002-4491-2509

INTRODUCTION

The traditional approach to education financing in Serbia is based on the principle that education at all levels should be accessible to everyone, meaning it should be free or as affordable as possible. Consequently, the state is expected to finance higher education institutions as well. The emergence of private higher education institutions, the cost of studying is not financed from the state budget, but is paid by the student himself. has introduced a new dimension to higher education[1]. Nowadays, about 13% of the total number of students in Serbia study at private higher education institutions. Comparisons between the operational models, study experiences, quality of scientific research, and especially doctoral studies, are frequently discussed in both professional and public discourse. The greatest challenge for private higher education institutions is financing, as tuition fees paid by students represent their predominant source of income. The number of students and tuition levels directly affect the number of teaching staff, their teaching load, and salaries. Public higher education institutions are primarily funded from the state budget, with the largest portion of funds allocated through the education budget. As scientific institutions, universities and faculties also receive part of their funding from the science budget, indirectly, through project-based financing. A significant portion of revenue also comes from tuition fees paid by students who do not qualify for state-funded education.

The objective of this paper is to examine the level and structure of funding sources for public higher education institutions in the Republic of Serbia, as well as the structure and efficiency of their utilization in 2023 and 2024.

RESEARCH METHODOLOGY

The research encompasses all public higher education institutions in the Republic of Serbia. The necessary data were obtained from official sources, including the websites of the Ministry of Finance, the Ministry of Education, the Statistical Office of the Republic of Serbia, the Provincial Secretariat for Finance of the Autonomous Province of Vojvodina (APV), and the Faculty of Philosophy at the University of Belgrade. All data sources are publicly available.

The collected data were systematized according to higher education institutions to allow for grouping of total funding sources by purpose. The systematized data are comprehensively presented in several tables. The available data enabled the creation of several simple indicators of allocation results. There are minimal discrepancies in the student numbers reported by the Statistical Office of the Republic of Serbia and the Ministry of Education. These differences are natural, as student numbers frequently change (e.g., some study programs start later, students transfer between institutions, graduate, or drop

[1] The oldest private university in Serbia, the "Braća Karić" University, was founded in 1993.

out). However, these variations do not affect the results of this study. Additionally, the data on the Ministry of Education's website include figures for the University of Priština, whereas the Statistical Office's data do not.

Another discrepancy relates to financial data sources. The 2023 budget figures are final, whereas the 2024 budget has not yet been officially adopted. It is not possible to assess the degree of deviation between the projected and final figures, so all financial data for 2024 should be considered indicative.

When analyzing the data, it is important to note that the budget is adopted on a calendar-year basis, whereas student population changes follow the academic year cycle (October 1 – September 30).

FINDINGS AND DISCUSSION

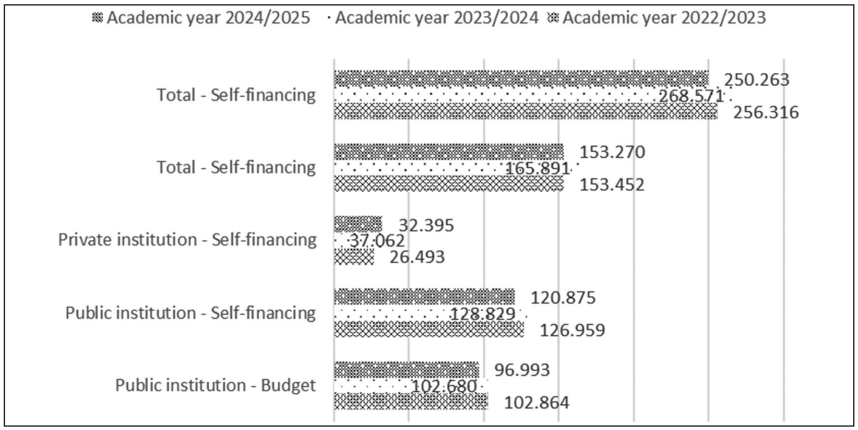
According to data from the Ministry of Education's website, Serbia currently has 23 universities, encompassing 187 higher education institutions, 63% of which are public and 37% private. At present, 250,668 students are enrolled in universities, with 87% attending public institutions and 13% studying at private institutions.

Table 1: Number and structure of higher education institutions in Serbia in the 2024/2025 academic year

		Number of institutions			Number of students		
			Of which:			Of which:	
Institution	Number of universities	Total	Faculties	Colleges/ Academies of Applied Studies*	Total	Faculties	Colleges/ Academies of Applied Studies*
Public Institution	9	117	95	22	217.848	187.985	29.863
Private Institution	14	70	46	24	32.395	24.631	7.764
Total	23	187	141	46	250.243	212.616	37.627
STRUCTURE							
Public Institution	39%	63%	67%	48%	87%	88%	79%
Private Institution	61%	37%	33%	52%	13%	12%	21%
Total	100%	100%	100%	100%	100%	100%	100%
Average Number of Students per Higher Education Institution							
Public Institution					1.862	1.979	1.357
Private Institution					463	535	324
Total					1.338	1.508	818

Source: Authors, number of institutions according to (7).

According to the Law on Higher Education, the activities of higher education are carried out by universities, faculties, or art academies within universities, academies of applied studies, colleges, and colleges of applied studies. A higher education institution engages in scientific research, artistic, expert-consulting, and publishing activities. (1)



Graph 1: Trend in the Number of Enrolled Students in the 2022/2023, 2023/2024, and 2024/2025 Academic Years.

Source: Authors, based on (7)

HIGHER EDUCATION INSTITUTIONS FUNDED FROM THE BUDGET

According to data on the website of the Ministry of Education, 268,571 students studied in Serbia in the 2023/2024 academic year. About 44% of students studying at public higher education institutions were funded by the state budget, while the majority, about 55% of students, paid tuition fees on their own. The total share of self-financing students, including both public and private higher education institutions, is around 62%. A more detailed breakdown of funding sources is presented in Table 2.

According to the Statistical Office of the Republic of Serbia (2024), in the 2023/2024 academic year, a total of 249,768 students were enrolled in higher education institutions in Serbia. Of these, 96,681 students (39%) were funded by the state budget, while 111,542 students at public institutions were self-financing. The total number of self-financing students across both public and private higher education institutions amounted to 153,087 (61%).

When considering the type of higher education institutions, the share of students funded by the budget at universities amounts to 47%, which is approximately ten percentage points higher than the share of students funded by the budget at colleges/academies (42%).

The teaching staff at higher education institutions consists of lecturers (lecturers, senior lecturers, assistant professors, associate professors, and full professors), researchers, and associates (teaching assistants and PhD teaching assistants) who engage in educational, scientific, artistic, research, and innovation activities. In addition to teaching staff, higher education institutions also employ non-teaching personnel responsible for professional, administrative, and technical tasks. According to the Statistical Office of the Republic of Serbia (6), in the 2023/2024 academic year, there were 12,495 teaching staff and associates in higher education institutions in Serbia, of whom 9,295 were teaching staff. Universities employed 95% of the

teaching staff and associates (representing 80% of institutions and 84% of students), while higher education colleges and academies employed the remaining 5% of teaching staff and associates (representing 20% of institutions and 16% of students).

Real estate and other assets necessary for the establishment and operation of state higher education institutions are state-owned.

Table 2: Methods of financing higher education in Serbia

(In dinars)	Academic Year		
Ownership type of institution	2022/2023	2023/2024	2024/2025
Public Institution - Budget	102.864	102.680	96.993
Public Institution - Self-financing	126.959	128.829	120.875
Private Institution - Self-financing	26.493	37.062	32.395
Total - Self-financing	153.452	165.891	153.270
Total	256.316	268.571	250.263
Of which:			
University of Priština	*	*	*
Public Institution - Budget	3.272	2.959	2.353
Public Institution - Self-financing	2.330	2.200	1.827
Total	5.602	5.159	4.180
Share of budgeted students at public institutions	45%	44%	45%
Share of self-financing students at public institutions	55%	56%	55%
Budgeted students / Total number of students	40%	38%	39%
Self-financing students / Total number of students	60%	62%	61%

Source: Authors, based on (7)

* Note: The data on the Ministry of Education website include information for the University of Priština, whereas the data from the Statistical Office of the Republic of Serbia do not include these figures.

Table 3: Funding method of the studying costs by type of higher education institutions in the academic year 2023/2024

Type of institution	Number of universities and higher education institutions/ academies	Number of institutions within the university	Number of students	Of which:		Share of students on the budget
				Budget	Salf-financing	
Univerisities	9	82	175.655	82.886	92.769	47%
Higher schools / academies	22	22	32.528	13.795	18.773	42%
Total	31	104	208.183	96.681	111.542	46%
STRUCTURE						
Universities		79%	84%	86%	83%	
Higher schools /academies		21%	16%	14%	17%	
Total		100%	100%	100%	100%	

Source: Authors, based on (6)

* Note: The Statistical Office of the Republic of Serbia (RZS) does not include the University of Priština in its data. The Ministry of Education includes the University of Priština on its website and lists a total of 10 universities.

Table 4: Teaching Staff and Associates at Higher Education Institutions in Serbia in the 2023/2024 Academic Year.

Institution	Number of Universities and Colleges/ Academies	Number of Institutions within Universities and Colleges/ Academies	Number of Teaching Staff	Of which:	
				Teachers	Associates
Universities	9	82	8.635	7.335	2.000
Higher education institutions/academies	22	21	576	487	89
Total	31	103	9.211	7.822	2.089
STRUCTURE					
Universities		80%	94%	94%	96%
Higher education institutions/academies		20%	6%	6%	4%
Total		100%	100%	100%	100%

Izvor: Autori, prema (6)

HIGHER EDUCATION INSTITUTIONS FUNDED FROM THE BUDGET

In this section, we will first examine the amounts allocated from the budget for higher education. Next, we will analyze the structure of the sources of these funds. Finally, we will provide a detailed review of the distribution of funds across universities. The information for this analysis was obtained from the Law on the Final Budget Account of the Republic of Serbia for 2023, which presents the realized amounts, and the Law on the Budget of the Republic of Serbia, which outlines the planned amounts[2].

From the total budget of the Republic of Serbia (RS), in the past two years, slightly more than 10% of the budgetary funds have been allocated to the responsibilities of the Ministry of Education. About one-fifth of the allocated funds are intended for the financing of higher education.

The two most significant sources from which the budget funds are formed are budget revenues, which make up approximately two-thirds of the total funds, and own revenues of budget users, which constitute about one-third of the total funds. In 2023, the following amounts were allocated: 39,105 million dinars (63%) from budget revenues, and 19,010 million dinars (31%) from the higher education institutions' own revenue. In 2024, the allocations increased to 43,832 million dinars (69%) from budget revenues, and 19,640 million dinars (31%) from the higher education institutions' own revenue. The budget report does not provide information on the type or method of generating own revenues for higher education institutions, nor does it clarify whether these revenues are evenly distributed among institutions or formed in another way. Potential sources of these revenues include tuition fees paid by self-financing students, as well as income from scientific projects and other similar activities. According to the Law on Higher Education, the results of scientific, artistic, and research work may be commercialized, provided that

[2] The process of adopting the final budget has not yet been completed.

such activities do not compromise the quality of teaching and scientific work. Understanding the formation of these revenues is crucial for determining the methodology by which funds are allocated to all higher education institutions.

The budget of the Ministry of Education covers the funding of eight universities (details are provided in Table 5), as well as the operation of academies and colleges. Additionally, part of the funds is allocated for general-purpose activities, such as support for master's and doctoral studies.

The University of Defense and the University of Criminal Investigation and Police Studies are not financed from the Ministry of Education's budget. The University of Criminal Investigation and Police Studies is funded from the budget of the Ministry of Internal Affairs (Section 15.1 – University of Criminal Investigation and Police Studies). There is no data within the budget of the Ministry of Defense regarding funds allocated for the University of Defense.

Table 5: Formation and Use of Funds for Higher Education Financing from the Budget of the Republic of Serbia

(In dinars)	2023		2024	
	Law on the Final Budget Account of the Republic of Serbia for 2023	Structure	Law on the Budget of the Republic of Serbia for 2024	Structure
Budget of the Republic of Serbia	2.668.817.573.616	100%	2.940.873.800.000	100%
Ministry of Education	282.887.792.224	11%	314.192.950.000	11%
HIGHER AND UNIVERSITY EDUCATION	61.675.430.956	2%	63.472.882.000	2%
SOURCES OF FINANCING				
REVENUES				
General budget revenues and receipts	39.105.837.620	63%	43.832.265.000	69%
Own revenues of budget beneficiaries	19.010.320.000	31%	19.640.617.000	31%
Donations from foreign countries	218.849.000	0%	-	0%
Donations from international organizations	1.893.916.000	3%	-	0%
Transfers from other levels of government	1.061.044.000	2%	-	0%
Voluntary transfers from individuals and legal entities	147.702.000	0%	-	0%
Receipts from foreign loans	226.432.336	0%	-	0%
EU financial assistance	11.330.000	0%	-	0%
Total	**61.675.430.956**	**100%**	**63.472.882.000**	**100%**
EXPENDITURES				
Modernization of higher education institution infrastructure	398.754.049	1%	212.000.000	0%
Support for:				
University of Belgrade	36.066.671.996	58%	25.873.624.000	41%
University of Novi Sad	8.124.693.239	13%	10.816.427.000	17%
University of Kragujevac	3.284.071.076	5%	4.705.580.000	7%
University of Niš	4.152.473.200	7%	6.853.767.000	11%
University of Priština with temporary seat in Kosovska Mitrovica	3.143.328.060	5%	3.826.465.000	6%
State University of Novi Pazar	585.434.686	1%	662.025.000	1%
University of Arts	1.672.881.822	3%	2.048.387.000	3%
Support for Higher Education Schools	4.015.680.119	7%	8.200.909.000	13%
openness of higher education	43.970.534	0%	62.549.000	0%
implementation of doctoral studies	170.012.173	0%	169.001.000	0%
Development of higher education	3.000.000	0%	33.100.000	0%
implementation of master's studies at universities	14.460.000	0%	9.048.000	0%
Total	**61.675.430.954**	**100%**	**63.472.882.000**	**100%**

Source: Authors, based on (4) and (2)

Higher education institutions in the territory of the Autonomous Province of Vojvodina (APV) are directly funded from the APV budget. Funds for salary financing are provided from the RS budget and transferred to the APV budget. Funds for other expenses are provided directly from the APV budget.

The total funds for financing higher education include funds from the budget of the RS Ministry of Education, funds from the budget of the Provincial Secretariat for Higher Education and Scientific Research, a portion of the budget of the Ministry of Internal Affairs for the University of Criminal Investigation and Police Studies, a portion of the budget of the Ministry of Defense for the University of Defense, and a portion of the budget of the Ministry of Science, Technological Development, and Innovation, as shown in Table 7.

Table 6: Allocations from the APV budget for financing the higher education function.

(In dinars)	Decision on the final account of the budget of the APV for the year 2023.	Decision on the revised budget cccount of APV for the year 2024.
APV Budget Provincial Secretariat for Education		
Support for the Work of Higher Education Institutions	9.008.253.585	10.561.319.622
Modernization of Higher Education Infrastructure	241.546.934	54.389.980
Total	9.249.800.520	10.615.709.602
Including:		
Transfer from the RS Budget to the APV Budget	8.124.693.239	9.277.623.000
Net Allocations from the APV Budget	1.125.107.281	1.338.086.602

Source: Authors, according to (8) and (9).

Note: Funds for salaries, allowances, and employee compensations (wages) as well as employer-paid social contributions are transferred from the RS budget to the APV budget as transfer funds for employees in higher education institutions in AP Vojvodina. (5, 228-229)

Table 7: Total amount of funds allocated from the budget for higher education.

(In dinars)	2023		2024	
Budget of the Ministry of Education of the Republic of Serbia	61.675.430.954		63.472.882.000	
Budget of APV – excluding transfers from the RS	1.125.107.281		1.338.086.602	
Budget of the Ministry of Internal Affairs – portion for the University of Criminal Investigation and Police Studies	675.268.176		668.061.000	
Budget of the Ministry of Defense – portion for the University of Defense	Nema podataka	%	Nema podataka	%
Total for higher education institutions	63.475.806.411	85	65.479.029.602	83
Student standard from the RS budget	11.340.326.149	15	13.228.814.000	17
TOTAL	74.816.132.560	100	78.707.843.602	100
Ministry of Science, Technological Development, and Innovation	33.991.384.078		36.512.125.000	
Of which: portion for projects at higher education institutions	Nema podataka		Nema podataka	

Source: Authors.

Table 8: Use of budget funds by purpose (in dinars)

Consolidated Expenditures for Financing Higher Education in the Republic of Serbia (Budget of the Republic of Serbia and Budget of the Autonomous Province of Vojvodina)	2023.	Structure	2024.	Structure	Change 2024 minus 2023	Growth rate 2024/2023
Direct financing from the RS budget						
Salaries, allowances, and employee benefits (wages)	31.929.416.045		35.783.649.000			
Social contributions borne by the employer	4.804.603.643		5.483.205.000			
In-kind benefits	89.768.838		64.887.000			
Social benefits for employees	299.785.124		266.978.000			
Reimbursement of employee expenses	529.012.184		413.900.000			
Employee rewards and other special expenses	226.866.887		155.669.000			
Indirect financing through transfers to the APV budget						
Transfer from the RS Budget to the APV Budget for salaries and wage taxes borne by the employer	8.124.693.239		9.277.623.000			
TOTAL SALARIES AND WAGE ALLOWANCES	46.004.145.960	72%	51.445.911.000	79%	5.441.765.040	12%
Operating expenses from the APV budget	883.560.344		1.283.696.622			
Direct financing from the RS budget						
Fixed costs from the budget	2.128.682.550		1.881.747.000			
Travel expenses	1.065.654.478		590.845.000			
Contractual services	5.317.741.247		3.587.032.000			
Specialized services	2.173.221.676		1.673.803.000			
Current repairs and maintenance	621.560.798		592.655.000			
Materials	1.238.229.075		1.152.617.000			
Depreciation of real estate and equipment	11.318.000		-			
TOTAL OPERATING EXPENSES	13.439.968.168	21%	10.762.395.622	16%	-2.677.572.546	-20%
Repayment of domestic interest	2.148.000		80.438.000			
Accompanying borrowing costs	10.105.000		7.187.000			
Grants to international organizations	7.672.000		875.000			
Transfers to other levels of government	758.934.285		913.795.000			
Other grants and transfers	387.875.000		2.060.000			
Social protection benefits from the budget	127.824.000		27.092.000			
Grants to non-governmental organizations	14.451.000		10.186.000			
Taxes, obligations, fees, fines, penalties, and interest	39.804.309		43.433.000			
Monetary fines and penalties by court decision	11.482.000		7.731.000			
Compensation for work-related injuries or other natural causes	-		1.160.000			
Compensation for injuries or damages caused by state authorities	27.126.000		16.500.000			
Buildings and construction facilities	546.708.738		498.119.000			
Machinery and equipment	1.041.789.357		943.139.000			
Other real estate and equipment	-		10.144.000			
Cultivated assets	3.207.000		9.232.000			
Intangible assets	68.187.905		91.558.000			
Production inventories	-		19.640.000			
Inventories of goods for resale	112.634.000		48.346.000			
TOTAL OTHER EXPENSES	3.159.948.594	5%	2.730.635.000	4%	- 429.313.594	-14%
ALLOCATED BY UNIVERSITIES	62.604.062.722	99%	64.938.941.622	99%	2.334.878.900	4%
COMMON PURPOSES	231.442.707		273.698.000			
MODERNIZATION OF HIGHER EDUCATION INFRASTRUCTURE	640.300.983		266.389.980			
TOTAL	63.475.806.412	100%	65.479.029.602	100%	2.003.223.190	3%

Source: Authors, based on (4), (2), (8), and (9).

Table 9: Changes in the structure of university funding in 2024 compared to 2023.

	Changes 2024 minus 2023			
University	Total	Changes in Salaries 2024-2023	Changes in Operating Costs	Changes in Other Expenses
University of Belgrade	-10.193.047.997	-2.676.326.497	-6.138.315.500	-1.378.406.000
University of Kragujevac	1.421.508.924	670.963.019	587.108.905	163.437.000
University of Niš	2.701.293.800	1.170.520.517	1.223.042.283	307.731.000
University of Priština with a temporary seat in Kosovska Mitrovica	683.136.939	467.512.845	152.433.094	63.191.000
Support for the State University of Novi Pazar	76.590.314	61.118.242	14.409.072	1.063.000
Support for the University of Arts	375.505.177	229.369.920	125.749.257	20.386.000
Support for Higher Education Schools	4.185.228.880	2.789.193.326	955.605.839	440.429.715
University of Criminal Investigation and Police Studies	- 7.207.176	37.679.907	2.258.226	- 47.145.309
University of Defense	-	-	-	-
Support for Higher Education in Vojvodina (University of Novi Sad)	1.311.519.103	37.679.907	400.136.278	-
Common Purposes	- 630.196.756	-	-	-
Total	1.463.135.210	5.441.765.040	-2.677.572.546	- 429.313.594

Sources: Authors.

The total amount of funds allocated for higher education from the RS budget and the APV budget is at least 63,475 million dinars in 2023 and 65,479 million dinars in 2024. In addition, allocations for student welfare amount to 11,340 million dinars in 2023 and 13,228 million dinars in 2024. Universities and faculties are not only educational but also scientific institutions. A portion of the funds for the development of scientific activities also flows into higher education institutions.

In 2023, a total of 63,475 million dinars was spent on higher education. The projected expenditure for 2024 amounts to 65,479 million dinars, which is 2,344 million dinars (approximately 3%) more than the previous year. The largest portion of the funds, 72% in 2023 and 79% in 2024, is allocated for salary payments. Compared to 2023, salaries in 2024 have increased by 5,442 million dinars. For covering regular operating expenses, 21% of the realized funds were used in 2023, while 16% of the projected funds are allocated for the same purpose in 2024. The total funds for these purposes in 2024 are 2,678 million dinars (around 20%) lower than in 2023. Changes in budget allocations indicate that the salary increase in 2024 was financed not only by the overall increase in the higher education budget but also by reducing total operating costs and other expenditures.

When observed by individual universities, a significant reduction in funding for the University of Belgrade is evident. The funds allocated for salaries at this university have been reduced by over 2,676 million dinars, the funds for operating costs have been reduced by over 6,138 million dinars, and the funds for other expenses have been reduced by over 1,378 million dinars. The total reduction in funding for the University of Belgrade exceeds 10,193 million dinars. In contrast to the University of Belgrade, budget allocations for covering expenses at almost all other universities have increased. Detailed changes in funding amounts in 2024 compared to 2023 are presented in Table 9.

The expenditure structure for financing higher education institutions by university is presented in Table 10.

Table 10: Structure of budget fund utilization by universities and higher education institutions in 2023 and 2024.

2023	Budget of the Republic of Serbia, Section 26.4 Higher and University Education (*)								Budget of the Ministry of Internal Affairs, Section 15.1 Criminalistics-Police University	Budget of the Ministry of Defense, Section 19	Budget of the APV, Program 2005 Higher Education	Unallocated parts of the Budget of the Republic of Serbia and the Budget of the AP of Vojvodina	
Program Code	0004	0005	0006	0007	0008	0009	0010	0011			2005		
University	University of Belgrade	University of Novi Sad	University of Kragujevac	University of Niš	University of Priština with temporary seat in Kosovska Mitrovica	Support for the State University of Novi Pazar	Support for the University of Arts	Support for Higher Education Schools	University of Criminal Investigation and Police Studies	University of Defense	Support for higher education in Vojvodina (including transfers from the Budget of the Republic of Serbia)	Common Purposes	Total
Column Serial Number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(14)
SALARIES AND WAGE ALLOWANCES	21.843.313.497	8.124.693.239	3.163.480.981	4.029.388.483	3.085.187.155	547.471.758	1.578.235.080	3.151.929.674	480.446.093	-	8.124.693.239	-	46.004.145.960
OPERATING COSTS	11.869.840.500	-	120.590.095	123.084.717	58.140.906	37.962.928	94.646.743	125.565.161	126.576.774	-	883.560.344	-	13.439.968.168
OTHER EXPENSES	2.353.518.000	-	-	-	-	-	-	738.185.285	68.245.309	-	-	-	3.159.948.594
ALLOCATED BY UNIVERSITIES	36.066.671.997	8.124.693.239	3.284.071.076	4.152.473.200	3.143.328.061	585.434.686	1.672.881.823	4.015.680.120	675.268.176	-	9.008.253.585	-	62.604.062.722
COMMON PURPOSES	-	-	-	-	-	-	-	-	-	-	-	231.442.707	231.442.707
MODERNIZATION OF HIGHER EDUCATION INFRASTRUCTURE		-	-	-	-	-	-	-	-	-	-	231.442.707	231.442.707
TOTAL	36.066.671.997	8.124.693.239	3.284.071.076	4.152.473.200	3.143.328.061	585.434.686	1.672.881.823	4.015.680.120	675.268.176	-	9.249.800.519	630.196.756	63.475.806.412

2024	Budget of the Republic of Serbia, Section 26.4 Higher and University Education (*)								Budget of the Ministry of Internal Affairs, Section 15.1 Criminalistics-Police University	Budget of the Ministry of Defense, Section 19	Support for higher education in Vojvodina (including transfers from the Budget of the Republic of Serbia)	Unallocated parts of the Budget of the Republic of Serbia and the Budget of the AP of Vojvodina	
Program Code	0004	0005	0006	0007	0008	0009	0010	0011			2.005		
University	University of Belgrade	University of Novi Sad	University of Kragujevac	University of Niš	University of Priština with temporary seat in Kosovska Mitrovica	Support for the operation of the State University of Novi Pazar	Support for the operation of the University of Arts	Support for the operation of higher education institutions	Criminalistics-Police University	University of Defense	Support for higher education in Vojvodina	Common purposes	Total
Column Serial Number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(14)
SALARIES AND WAGE ALLOWANCES	19.166.987.000	1.538.804.000	3.834.444.000	5.199.909.000	3.552.700.000	608.590.000	1.807.605.000	5.941.123.000	518.126.000	-	9.277.623.000	-	51.445.911.000
OPERATING COSTS	5.731.525.000	-	707.699.000	1.346.127.000	210.574.000	52.372.000	220.396.000	1.081.171.000	128.835.000	-	1.283.696.622	-	10.762.395.622
OTHER EXPENSES	975.112.000	9.277.623.000	163.437.000	307.731.000	63.191.000	1.063.000	20.386.000	1.178.615.000	21.100.000	-	-	-	2.730.635.000
ALLOCATED BY UNIVERSITIES	25.873.624.000	10.816.427.000	4.705.580.000	6.853.767.000	3.826.465.000	662.025.000	2.048.387.000	8.200.909.000	668.061.000	-	10.561.319.622	-	64.938.941.622
COMMON PURPOSES	-	-	-	-	-	-	-	-	-	-	-	273.698.000	273.698.000
MODERNIZATION OF HIGHER EDUCATION INFRASTRUCTURE	-	-	-	-	-	-	-	-	-	-	54.389.980	212.000.000	266.389.980
TOTAL	25.873.624.000	10.816.427.000	4.705.580.000	6.853.767.000	3.826.465.000	662.025.000	2.048.387.000	8.200.909.000	668.061.000	-	10.615.709.602	485.698.000	65.479.029.602

Source: Authors, based on (2), (3), (4), and (8).

Table 11: Structure and Efficiency of Budget Fund Utilization.

	University of Belgrade	University of Kragujevac	University of Niš	University of Priština with temporary seat in Kosovska Mitrovica	Support for the State University of Novi Pazar	Support for the University of Arts	Support for Higher Education Schools	University of Criminal Investigation and Police Studies	University of Defense	University of Novi Sad	Total
Budget 2023	36.066.671.996	3.284.071.076	4.152.473.200	3.143.328.060	585.434.686	1.672.881.822	4.015.680.119	675.268.177	-	9.249.800.519	63.475.806.411
Budget 2024	25.873.624.000	4.705.580.000	6.853.767.000	3.826.465.000	662.025.000	2.048.387.000	8.200.909.000	668.061.000	-	10.615.709.602	65.479.029.602
Budget 2025	31.335.382.000	5.937.741.000	8.714.614.000	4.467.217.000	782.999.000	2.505.517.000	9.710.873.000	801.570.000		18.973.670.000	83.229.583.000
Budget increase for 2025 – student request number 4											12.010.000.000
Number of institutions	32	13	14	11	1	5	22	1	1	15	114
Number of teaching staff	4.720	1.244	1.480	-	182	489	576	76	444	3.284	9.211
- Teachers	3.664	889	1.126	700	133	406	487	73	344	2.173	7.822
- Associates	1.056	355	354	-	49	83	89	3	100	1.111	2.089
Number of students	90.152	15.202	22.000	5.160	2.681	2.905	32.528	725	881	41.109	213.343
- Budget	37.352	7.767	11.446	2.959	1.264	1.809	13.795	335	800	22.113	99.640
- Self-financing	52.800	7.435	10.554	2.201	1.417	1.096	18.733	390	81	18.996	113.703
Indicators for 2023											
Average budget per student	400.065	216.029	188.749	609.172	218.364	575.863	123.453	931.404	-	219.131	293.443
Average budget per budget student	965.589	422.824	362.788	1.062.294	463.160	924.755	291.097	2.015.726	-	219.131	628.303
Average budget per teacher	9.843.524	3.694.118	3.687.809	4.490.469	4.401.765	4.120.399	8.245.750	9.250.249	-	4.145.538	8.003.588
Indicators for 2024											
Average budget per student	287.000	309.537	311.535	741.563	246.932	705.125	252.118	921.463	-	256.910	304.387
Average budget per budget student	692.697	605.843	598.791	1.293.162	523.754	1.132.331	594.484	1.994.212	-	477.607	651.736
Average budget per teacher	7.061.579	5.293.116	6.086.827	5.466.379	4.977.632	5.045.288	16.839.649	9.151.521	-	4.860.248	8.302.089
Index of budget amount change 2024/2023	72%	143%	165%	122%	113%	122%	204%	99%	0%	117%	104%
Index of budget amount change 2025/2024	121%	126%	127%	117%	118%	122%	118%	120%	0%	179%	127%

Source: Authors, based on (2), (3), (4)

INDICATORS OF BUDGET FUND UTILIZATION EFFICIENCY

The available data do not provide a comprehensive insight into the efficiency of state budget utilization by state-owned higher education institutions. For the purpose of analyzing the efficiency of budget fund utilization, we have identified the following possible indicators: the average budget per student, the average budget per budget student, and the average budget per teacher. Data on the number of teachers and students were obtained from the publication of the Statistical Office of the Republic of Serbia, "Higher Education 2023/2024" (6), which we consider to be the most relevant basis for efficiency calculations, given the difference between the academic and calendar years. The number of students at the University of Priština with a temporary seat in Kosovska Mitrovica was taken from the website of the Ministry of Finance.

The budget amount was chosen as the fundamental element of efficiency indicators. The budget is largely determined by external factors and is therefore limited, while the basic structure of its designated allocation remains relatively stable. An increase in budget allocations for one purpose inevitably requires a reduction in funding for another.

At the level of the Republic of Serbia, the average budget per student in 2023 amounted to 293,443 dinars, while in 2024, it increased to 304,387 dinars. Although this indicator is not the most precise measure of budget utilization efficiency, we consider it important because the budget funds the entire infrastructure and logistics required for teaching, both for budget and self-financing students. A better indicator of budget utilization efficiency is the average budget per budget student and the average budget per teacher. The average budget per budget student in 2023 was 628,303 dinars, while in 2024, it reached 651,736 dinars. This indicator varies significantly between universities and higher education institutions, with the University of Novi Sad having the lowest values and the University of Criminal Investigation and Police Studies having the highest. The indicator of the average budget per teacher was 8.0 million dinars in 2023 and increased to 8.3 million dinars in 2024. The highest value of this indicator is observed in higher education schools, with 8.2 million dinars in 2023 and 16.8 million dinars in 2024. The University of Belgrade and the University of Criminal Investigation and Police Studies also recorded more than 9 million dinars per teacher in 2023. In 2024, only the University of Criminal Investigation and Police Studies exceeded the 9 million dinar threshold. A detailed overview of these indicators, categorized by universities and higher education schools/academies, is presented in table 11.

ILLUSTRATION OF FINANCIAL OPERATIONS IN HIGHER EDUCATION INSTITUTIONS IN THE REPUBLIC OF SERBIA

To gain a comprehensive insight into the financial operations of a higher education institution, we have selected the financial operations report of the Faculty of Philosophy at the University of Belgrade. This choice was not random. It is very difficult to find detailed financial information on faculty websites. Even when available, they are often unclear (in online formats), difficult to navigate, lacking clear descriptions, missing the time period they refer to, and omitting the currency unit of measurement. Additionally, consolidated financial reports at the university level are not mentioned at all. The Faculty of Philosophy at the University of Belgrade (hereinafter: the Faculty) has published highly detailed business reports on its website, providing a complete overview of both financial and non-financial operations.

An analysis of the revenues generated in 2023 shows that, alongside core revenues from the Ministry of Education amounting to 821,051,748 dinars, the Faculty also generates its own revenues of 202,520,804 dinars and research-designated revenues of 517,200,351 dinars. Compared to revenues from the Ministry of Education, additional revenues reach 78% of those core revenues. The research-designated revenues primarily come from the Ministry of Science, Technological Development and Innovation, as well as the Ministry of Culture. The total revenue from all ministries amounts to 1,272,512,056 dinars, which is 1.6 times higher than the core revenues from the Ministry of Education.

Within the Faculty's own revenues, the largest portion comes from tuition fees, amounting to 128,270,398 dinars, which are paid by self-financing students (104,760,057 dinars) and other fees, such as entrance exam fees (12,060,123 dinars), exam application fees (6,851,479 dinars), and similar charges.

On the expenditure side, the largest costs are salaries and other employee-related compensations, totaling 1,248,383,774 dinars, which account for 81% of total expenses and expenditures.

A more detailed breakdown of revenues, expenses, and expenditures is provided in Table 12.

From the perspective of the structure of the most significant income, expense, and expenditure categories, it is evident that in the revenue structure, the largest share comes from the Ministry of Education (53%), followed by research-designated revenues (34%) and the institution's own revenues (13%) of total income. In the structure of expenses and expenditures, the most significant costs are salaries and employee compensations (81%). Other expenses account for 19% of total expenditures, while investments in equipment are negligible. A summarized overview of income, expenses, and expenditures is provided in Table 13.

Table 12: Structure of Revenues, Expenses, and Expenditures for 2023.

University of Belgrade - Faculty of Philosophy **Revenues and Expenses, Expenditures, and Financial Result for 2023** (In dinars)			In that, from:		
	2022.	2023.	Ministry of Education	Faculty's own revenues	Earmarked funds for scientific research, publishing activities, international cooperation, etc.
REVENUES					
Ministry of Education	746.533.159	821.051.748	821.051.748	-	-
Ministry of Science, Technological Development, and Innovation	409.044.815	451.460.308	-	37.638.790	413.821.518
Ministry of Culture	5.249.508	8.459.923	-		8.459.923
Donations and other revenues	35.499.595	27.657.275	-	2.391.287	25.265.988
Tuition fees and other student payments	128.691.170	130.274.884	-	128.270.398	2.004.486
Rental income	26.425.148	30.496.241	-	30.496.241	-
Revenues for scientific research	51.647.534	71.441.524	-	3.724.088	67.717.436
TOTAL REVENUES	**1.403.090.929**	**1.540.841.903**	**821.051.748**	**202.520.804**	**517.269.351**
Ratio of other revenues to revenues from the Ministry of Education			**100%**	**25%**	**63%**
EXPENSES AND EXPENDITURES					
Salaries and allowances for employees	1.140.226.763	1.248.383.774	812.576.738	134.618.306	301.188.730
Fixed costs	39.167.139	48.650.122	4.356.012	44.123.163	170.947
Travel expenses	11.060.743	15.545.718	56.771	418.412	15.070.535
Contracted services	92.338.946	92.357.306	729.984	15.775.702	75.851.620
Specialized services	111.223.573	114.138.244	2.846.255	9.289.107	102.002.882
Ongoing repairs and maintenance	14.685.446	9.900.530	-	9.196.171	704.359
Materials	6.801.274	8.753.579	485.988	6.101.400	2.166.191
Social protection allowances from the budget	24.000	25.000	-	25.000	-
Taxes, fees, and fines	183.612	360.001	-	21.691	338.310
TOTAL OPERATING EXPENSES	**1.415.711.496**	**1.538.114.274**	**821.051.748**	**219.568.952**	**497.493.574**
Administrative equipment	3.139.757	3.034.760	-	1.173.472	1.861.288
Equipment for education and science	9.001.334	4.286.264	-	72.641	4.213.623
Library books and software	1.212.120	1.351.329	-	1.351.329	-
TOTAL CAPITAL EXPENDITURES	13.353.211	8.672.353	-	2.597.442	6.074.911
TOTAL EXPENSES AND EXPENDITURES	**1.429.064.707**	**1.546.786.627**	**821.051.748**	**222.166.394**	**503.568.485**
RESULT	**- 25.973.778**	**- 5.944.724**	**-**	**- 19.645.590**	**13.700.866**

Source: Authors, according to (11).

Table 13: Summary of Income, Expenses, and Expenditures.

University of Belgrade - Faculty of Philosophy **Condensed Statement of Revenues, Expenses, and Expenditures** (In dinars)	2023.	Percentage in relation to total revenues
Revenues		
Revenues from the Ministry of Education	821.051.748	53%
Own revenues from tuition fees and similar sources	202.520.804	13%
Revenues for scientific research	517.269.351	34%
Total revenues	**1.540.841.903**	**100%**
Expenses and Expenditures		
Employee salaries	1.248.383.774	81%
Other expenses	289.730.500	19%
Investments in equipment	8.672.353	1%
Total expenses	**1.546.786.627**	**100%**
LOSS	**- 5.944.724**	**-0,4%**

Source: Authors.

FINAL CONSIDERATIONS

The aim of this paper is to examine the amount and structure of funding sources for higher education in Serbia, as well as the structure and efficiency of the use of these funds in 2023 and 2024. All data used in this study are publicly available.

According to data from the Ministry of Education, in the 2023/2024 academic year, there were 268,571 students enrolled in higher education institutions in the Republic of Serbia, of whom 231.509 (86%) attended public institutions and 37,062 (14%) attended private institutions. Higher education takes place at 187 institutions, including 117 public and 70 private institutions (including the University of Priština). A total of 102,680 students (38%) study with government funding, while the majority, 165,891 students (62%), pay tuition fees. Universities employ 9.211 teaching staff, out of which 94% (accounting for 80% of institutions and 84% of students), while higher education colleges and academies employ the remaining 6% of staff (accounting for 20% of institutions and 16% of students).

In the observed period, more than 10% of the total budget of the Republic of Serbia was allocated for purposes under the jurisdiction of the Ministry of Education. Approximately one-fifth of these allocated funds were designated for financing higher education. The two most significant sources of budgetary funds are government revenues, which account for about two-thirds of the total, and the own revenues of budget users, which constitute approximately one-third. The budget report does not provide information on the type or method of generating own revenues for higher education institutions, nor does it specify whether these revenues are evenly distributed across institutions or vary by other criteria. In addition to the Ministry of Education, other ministries also allocate funds to higher education institutions for scientific research, but available data do not allow for a clear analysis of these allocations. The operations of two universities—the University of Defense and the University of Criminal Investigation and Police Studies—are financed directly from the budgets of the respective ministries. Higher education institutions in the Autonomous Province of Vojvodina (APV) receive funding from the APV budget, with the majority of these funds being transferred from the budget of the Republic of Serbia to the APV budget.

Three indicators were used to assess the efficiency of budgetary expenditures: the average budget per student, the average budget per budget student, and the average budget per teacher.

At the level of the Republic of Serbia, the average budget per student in 2023 was 293,443 dinars, while in 2024 it was 304,387 dinars. Although this indicator is not the most precise measure of budget efficiency, it is considered important since the budget finances the entire infrastructure and logistics necessary for teaching, benefiting both budget and self-financing students. The average budget per budget student was 628,303 dinars in 2023 and 651,736 dinars in 2024. This indicator varies significantly between universities and higher education colleges, with the lowest amounts recorded at the University of Novi Sad and the highest at the University of Criminal Investigation and Police Studies. The average budget per teacher was 8.0 million dinars in 2023 and 8.3 million dinars in 2024. The highest value of this indicator was recorded at higher education colleges, amounting to 8.2 million dinars in 2023 and 16.8

million dinars in 2024. The University of Belgrade and the University of Criminal Investigation and Police Studies also exceeded 9 million dinars per teacher in 2023, while in 2024, only the University of Criminal Investigation and Police Studies remained above this threshold. These indicators are only suggestive, as a comprehensive evaluation requires additional narrative explanations and methodological details regarding budget allocation.

To illustrate the financial structure of a higher education institution, the case of the Faculty of Philosophy at the University of Belgrade was examined. This institution was chosen because it is one of the few faculties that publishes detailed financial information on its website. The financial reports of the Faculty of Philosophy indicate that in 2023, 53% of its revenues came from the Ministry of Education, 13% from its own revenues (including tuition fees, entrance exam fees, exam registration fees, rental income, etc.), and 33% from funds allocated for scientific research, primarily by the Ministry of Science, Technological Development, and Innovation.

Our research also highlights significant deficiencies in the regulations regarding financial reporting for higher education institutions. Given that higher education institutions serve the public interest, it is reasonable to expect them to transparently publish detailed data and information about their financial plans and outcomes. This is particularly important considering that nearly two-thirds of students independently finance their education.

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Radojko Lukić[1]

ORIGINAL RESEARCH PAPER
UDC 343.37:005.934

DOI: 10.46793/Rev25109.037L
Received: 06.02.2025.
Accepted: 26.02.2025.
Published: 31.03.2025.

Analysis of Occupational Frauds Based on SWARA and MARCOS Method

Summary: *Recently, occupational fraud has become more pronounced, making its research highly challenging. This study investigates occupational fraud in various industries and high-risk departments using the SWARA and MARCOS methods. The research showed that, according to the results of the SWARA-MARCOS method, the top five sectors for occupational fraud include construction, religious, charitable, or social services, government and public administration, health care, and education. Occupational fraud is most prevalent in the construction sector, while the information industry experiences the least occupational fraud. Retail also has a relatively low incidence of occupational fraud. The key question is how to suppress or minimize occupational fraud across different sectors. This can be achieved through more effective control of collections, cash theft, cash-on-hand disbursements, unauthorized check and payment tampering, corruption, expense reimbursement fraud, financial statement fraud, cashless payments, payroll fraud, registered payments, and skimming. External audits, internal audits, state audits, and forensic accounting and auditing play significant roles in fraud prevention. Additionally, the digitization of entire business operations has a positive effect on the suppression of occupational fraud. It is necessary to develop ethical values among all participants in the value chain. Regarding occupational fraud in high-risk departments, according to the results of the SWARA-MARCOS method, the highest levels of occupational fraud occur in accounting, followed by finance. Other affected departments include Executive/Senior Management, Administrative Support, Procurement, Operations, Customer Service, and Sales. Occupational fraud is least prevalent in sales. Effective control of the accounting process and financial activities can significantly reduce occupational fraud. External audit, internal audit, forensic accounting, and auditing all play significant roles in this regard. The impact of digitizing accounting and financial operations is also noteworthy. Additionally, maintaining strong ethical standards in accounting and finance is crucial.*

Keywords: *occupational fraud, industry, departments, SWARA, MARCOS*

[1] Faculty of Economics, University of Belgrade, Serbia.
E-mail: radojko.lukic@ekof.bg.ac.rs
ORCID iD: https://orcid.org/0000-0001-6529-0297

INTRODUCTION

As is well known, business fraud has become more pronounced in recent times. It is a highly challenging field of research, requiring appropriate measures for suppression and minimization. This study analyzes business fraud in various industries and high-risk departments using the SWARA and MARCOS methods. The aim is to identify industries and high-risk departments most affected by occupational fraud and propose measures to suppress or minimize it. Effectively managing occupational fraud is challenging, which forms the basis of the main research hypothesis in this study. The findings of this research should contribute to more effective management of occupational fraud across different industries and high-risk departments.

LITERATURE REVIEW

In the literature, occupational fraud is investigated from various perspectives. Below, we highlight some key areas of focus. Due to its significance, special attention is given to business fraud in financial reports (24, 4, 15). Considerable research has also examined the impact of business digitization and artificial intelligence on fraud detection and prevention (3, 9, 34, 22, 12). The specifics of occupational fraud in banks (5, 10, 18, 2, 23) and in the insurance sector (32) have also been explored. Additionally, research emphasizes the role of external and internal audits in fraud detection and prevention (6, 17). Recently, forensic accounting has gained increasing attention for its role in identifying and preventing occupational fraud (1). Another crucial issue in the literature is the role of state audits in detecting and preventing fraud in public institutions (13, 21). Furthermore, researchers have examined occupational fraud in social services (25) and its specifics in small and medium-sized enterprises (26, 36). Multi-criteria decision-making methods are increasingly being applied to the analysis of occupational fraud (33). Overall, the literature provides a comprehensive examination of business fraud, recognizing its significant impact on annual revenue. In this study, the reviewed literature, along with other relevant sources, serves as a theoretical, methodological, and empirical foundation for analyzing occupational fraud in various industries and high-risk departments using the SWARA and MARCOS methods.

METHODOLOGY

The problem of occupational fraud in this study is analyzed on the basis of SWARA and MARCOS methods. Their basic characteristics are shown below.

SWARA

SWARA (Stepwise Weight Assessment Ratio Analysis) is a method that provides the opportunity for decision-makers to choose the best decision based on different situations and the importance of criteria according to their wishes and goals. It is applied in solving various decision-making problems.

The procedure for determining the weights of n criteria using the SWARA method can be summarized as follows (14, 28, 29):

Step 1: Identification and selection of criteria

Step 2: Sort the criteria according to their expected importance, in descending order

Step 3: Determining the relative importance of the criteria. In this step, the relative importance of the first criterion is set to 1, while the relative importance of the others is determined according to the previous one.

In the SWARA method, s_{j-1} it has a value of 0 if criterion j–1 has the same importance as criterion j, $s_j \in [0,1]$ and a lower value s_{j-1} indicates greater importance of criterion j in relation to criterion j–1.

Step 4: Calculation of the value of the coefficient k_j as:

$$k_j = \begin{cases} 1 & if\ j = 1 \\ s_j + 1 & if\ j > 1 \end{cases} \tag{1}$$

Step 5: Calculation of the value of the converted significance q_j as follows:

$$q_j = \begin{cases} 1 & if\ j = 1 \\ \dfrac{q_{j-1}}{k_j} & if\ j > 1 \end{cases} \tag{2}$$

Step 6: Calculating the weight of the criteria w_j as follows:

$$w_j = \frac{q_j}{\sum_{j=1}^{n} q_k} \tag{3}$$

MARCOS Method

The MARCOS (Measurement of Alternatives and Ranking According to Compromise Solution) method is based on defining the relationship between alternatives and reference values (ideal and anti-ideal alternatives) (8, 16, 19, 20, 23, 30, 31, 35, 7). Based on the defined relationships, the utility functions of the alternatives are determined, and a compromise ranking is made about ideal and anti-ideal solutions. Decision preferences

are defined based on a utility function. Utility functions represent the position of alternatives about ideal and anti-ideal solutions. The best alternative is the one that is closest to the ideal and at the same time furthest from the anti-deal reference point. The MARCOS method proceeds through the following steps (27, 30):

Step 1: Formation of the initial decision-making matrix. A multi-criteria model involves defining a set of *n* criteria and *m* alternatives. In the case of group decision-making, a group of *r* experts is formed who evaluate the alternatives in relation to the criteria. In that case, the expert evaluation matrices are aggregated into the initial group decision matrices.

Step 2: Forming the expanded initial matrix. In this step, the expansion initial matrix is defined with ideal (*AI)* and anti-ideal (*AAI*) solutions.

$$X = \begin{array}{c} \\ AAI \\ A_1 \\ A_2 \\ \cdots \\ A_m \\ AI \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \end{array} \\ \begin{bmatrix} x_{aa1} & x_{aa2} & \cdots & x_{aan} \\ x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \\ x_{ai1} & x_{ai2} & \cdots & x_{ain} \end{bmatrix} \end{array} \tag{4}$$

Anti-ideal solution (*AAI*) is the worst alternative. The ideal solution (*AI*) is, on the contrary, the alternative with the best characteristics. Depending on the nature of the criteria, *AAI* and *AI* are defined using the following equations:

$$AAI = \min_i x_{ij} \ if \ j \in B \ and \ \max_i x_{ij} \ if \ j \in C \tag{5}$$

$$AI = \max_i x_{ij} \ if \ j \in B \ and \ \min_i x_{ij} \ if \ j \in C \tag{6}$$

Where *B* represents the benefit and *C* the cost group of criteria.

Step 3: Normalization of the extended initial matrix (*X*). The elements of the normalized matrix $N = [n_{ij}]_{mxn}$ are obtained by applying the following equations:

$$n_{ij} = \frac{x_{ai}}{x_{ij}} \ if \ j \in C \tag{7}$$

$$n_{ij} = \frac{x_{ij}}{x_{ai}} \ if \ j \in B \tag{8}$$

Where the elements x_{ij} and x_{ai} represent the elements of the matrix *X*.

Step 4: Defining the weighting matrix $V = [v_{ij}]_{mxn}$. The weighting matrix *V* is obtained by multiplying the normalized matrix *N* with the weighting coefficients of the criterion w_j using the following equation:

$$v_{ij} = n_{ij} x w_j \tag{9}$$

Step 5: Determining the degree of usefulness of alternatives K_i. The degree of usefulness of alternatives to anti-ideal and ideal solutions is determined using the following equations:

$$K_i^- = \frac{S_i}{S_{aai}} \tag{10}$$

$$K_i^+ = \frac{S_i}{S_{ai}} \tag{11}$$

Where S_i $(i = 1,2, \ldots, m)$ represents the sum of the elements of the weight matrix V, shown in the following equation:

$$S_i = \sum_{i=1}^{n} v_{ij} \tag{12}$$

Step 6: Determining the utility function of alternatives $f(K_i)$. The utility function is the compromise of the observed alternative about ideal and anti-ideal solutions. The utility function of alternatives is defined by the following equation:

$$f(K_i) = \frac{K_i^+ + K_i^-}{1 + \frac{1 - f(K_i^+)}{f(K_i^+)} + \frac{1 - f(K_i^-)}{f(K_i^-)}} \tag{13}$$

Where $f(K_i^-)$ represents the utility function of the anti-ideal solution and $f(K_i^+)$ represents the utility function of the ideal solution.

Utility functions for ideal and anti-ideal solutions are determined using the following equations:

$$f(K_i^-) = \frac{K_i^+}{K_i^+ + K_i^-} \tag{14}$$

$$f(K_i^+) = \frac{K_i^-}{K_i^+ + K_i^-} \tag{15}$$

Step 7: Ranking of alternatives. The ranking of alternatives is based on the final value of the utility function. The alternative that has the highest possible value of the utility function is preferred.

RESULTS AND DISCUSSION

In this study, the research is directed in two directions, namely: Occupational fraud in various industries and occupational fraud in high-risk departments based on the SWARA and MARCOS methods.

Occupational fraud in various industries

The analyzed criteria are based on the nature of the problem being studied. Table 1 presents the relevant criteria for occupational fraud, the observed industries (alternatives), and the original empirical data.

Table 1. What are the most common occupational fraud schemes in different industries? (in %)

	Occupational fraud										
Industry	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**
A1	12	12	18	14	44	6	5	16	4	4	8
A2	27	6	4	7	55	17	6	29	10	1	9
A3	24	15	8	14	52	15	4	15	18	4	11
A4	38	9	8	12	47	21	1	22	16	2	9
A5	19	8	9	8	60	13	4	29	10	3	6
A6	17	10	13	5	40	6	0	32	3	9	14
A7	38	12	7	19	52	25	10	25	23	4	23
A8	36	9	13	10	43	17	0	16	7	6	19
A9	19	6	6	20	49	12	9	16	10	6	9
A10	28	9	2	9	65	11	3	32	14	0	5
A11	18	10	18	7	52	12	2	33	10	3	7
A12	36	17	24	17	45	29	3	10	7	2	16
A13	15	10	10	0	62	10	2	27	6	0	10
Statistics											
Mean	25.1538	10.2308	10.7692	10.9231	51.2308	14.9231	3.7692	23.2308	10.6154	3.3846	11.2308
Median	24.0000	10.0000	9.0000	10.0000	52.0000	13.0000	3.0000	25.0000	10.0000	3.0000	9.0000
Std. deviation	9.34386	3.16633	6.24705	5.79456	7.67196	6.86126	3.11325	7.82255	5.76684	2.56705	5.32531
Minimum	12.00	6.00	2.00	.00	40.00	6.00	.00	10.00	3.00	.00	5.00
Maximum	38.00	17.00	24.00	20.00	65.00	29.00	10.00	33.00	23.00	9.00	23.00

Industry		**Occupational fraud**	
A1	Banking and financial services	**C1.**	Billing
A2	Production	**C2.**	Cash theft
A3	Government and public administrations	**C3.**	Cash on hand
A4	Health care	**C4.**	Check and payment interference
A5	Energy	**C5.**	Corruption
A6	Retail	**C6.**	Expense reimbursements
A7	Construction	**C7.**	Financial reporting fraud
A8	Education	**C8.**	No cash
A9	Insurance	**C9.**	Payroll
A10	Technology	**C10.**	Register payments
A11	Transport and storage	**C11.**	Skimming
A12	Religious, charitable, or social services		
A13	Information		

Source: Occupational Fraud 2024: A Report to the Nations. Association of Certified Fraud Examiners – ACFE. Author's statistics.

In the context of classical analysis, we will refer, for example, to the issue of corruption. According to the data presented, corruption is the least prevalent in retail and most prevalent in the technology sector. It is strongly correlated with registered payments. To combat corruption, all relevant measures should be taken, such as promoting ethical business practices among both employees and clients.

Using the SWARA method, the weight coefficients of the criteria were determined (Table 2). (In this study, all calculations and results are by the authors.)

Table 2. Weight coefficients of criteria - SWARA

Criteria	s_j	k_j	w_j	q_j	q_j	Criteria	Ranking
C3	0	1	1	0.15	0.15	C1	2
C1	0.15	1.15	0.87	0.13	0.13	C2	3
C2	0.04	1.04	0.84	0.13	0.13	C3	1
C5	0.29	1.29	0.65	0.10	0.10	C4	5
C4	0.02	1.02	0.64	0.10	0.10	C5	4
C6	0.04	1.04	0.61	0.09	0.09	C6	6
C7	0.1	1.1	0.56	0.08	0.08	C7	7
C8	0.2	1.2	0.46	0.07	0.07	C8	8
C9	0.18	1.18	0.39	0.06	0.06	C9	9
C10	0.25	1.25	0.31	0.05	0.05	C10	10
C11	0.12	1.12	0.28	0.04	0.04	C11	11
			6.60	**1**			

The most important criterion in this case is cash on hand. Switching to cashless payments can, among other things, significantly affect the suppression of occupational fraud.

The ranking of industries according to occupational fraud, based on the calculated weight coefficients of the criteria, was performed using the MARCOS method. Tables 3 - 7 show the procedures and results of the MARCOS method.

Table 3. Initial Matrix

Weight of criteria	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04
Kind of criteria	1	1	1	1	1	1	1	1	1	1	1
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**
A1	12	12	18	14	44	6	5	16	4	4	8
A2	27	6	4	7	55	17	6	29	10	1	9
A3	24	15	8	14	52	15	4	15	18	4	11
A4	38	9	8	12	47	21	1	22	16	2	9
A5	19	8	9	8	60	13	4	29	10	3	6
A6	17	10	13	5	40	6	0	32	3	9	14
A7	38	12	7	19	52	25	10	25	23	4	23
A8	36	9	13	10	43	17	0	16	7	6	19
A9	19	6	6	20	49	12	9	16	10	6	9
A10	28	9	2	9	65	11	3	32	14	0	5
A11	18	10	18	7	52	12	2	33	10	3	7
A12	36	17	24	17	45	29	3	10	7	2	16
A13	15	10	10	0	62	10	2	27	6	0	10
MAX	38	17	24	20	65	29	10	33	23	9	23
MIN	12	6	2	0	40	6	0	10	3	0	5

Table 4. Extended Initial Matrix

Weight of criteria	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04
Kind of criteria	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
AAI	12	6	2	0	40	6	0	10	3	0	5
A1	12	12	18	14	44	6	5	16	4	4	8
A2	27	6	4	7	55	17	6	29	10	1	9
A3	24	15	8	14	52	15	4	15	18	4	11
A4	38	9	8	12	47	21	1	22	16	2	9
A5	19	8	9	8	60	13	4	29	10	3	6
A6	17	10	13	5	40	6	0	32	3	9	14
A7	38	12	7	19	52	25	10	25	23	4	23
A8	36	9	13	10	43	17	0	16	7	6	19
A9	19	6	6	20	49	12	9	16	10	6	9
A10	28	9	2	9	65	11	3	32	14	0	5
A11	18	10	18	7	52	12	2	33	10	3	7
A12	36	17	24	17	45	29	3	10	7	2	16
A13	15	10	10	0	62	10	2	27	6	0	10
AI	38	17	24	20	65	29	10	33	23	9	23

Table 5. Normalized Matrix

Weight of criteria	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04
Kind of criteria	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
AAI	0.315789	0.117647	0.083333	0	0.615385	0.206897	0	0.30303	0.130435	0	0.217391
A1	0.3158	0.7059	0.7500	0.7000	0.6769	0.2069	0.5000	0.4848	0.1739	0.4444	0.3478
A2	0.7105	0.3529	0.1667	0.3500	0.8462	0.5862	0.6000	0.8788	0.4348	0.1111	0.3913
A3	0.6316	0.8824	0.3333	0.7000	0.8000	0.5172	0.4000	0.4545	0.7826	0.4444	0.4783
A4	**1.0000**	0.5294	0.3333	0.6000	0.7231	0.7241	0.1000	0.6667	0.6957	0.2222	0.3913
A5	0.5000	0.4706	0.3750	0.4000	0.9231	0.4483	0.4000	0.8788	0.4348	0.3333	0.2609
A6	0.4474	0.5882	0.5417	0.2500	0.6154	0.2069	0.0000	0.9697	0.1304	**1.0000**	0.6087
A7	**1.0000**	0.7059	0.2917	0.9500	0.8000	0.8621	**1.0000**	0.7576	**1.0000**	0.4444	**1.0000**
A8	0.9474	0.5294	0.5417	0.5000	0.6615	0.5862	0.0000	0.4848	0.3043	0.6667	0.8261
A9	0.5000	0.3529	0.2500	**1.0000**	0.7538	0.4138	0.9000	0.4848	0.4348	0.6667	0.3913
A10	0.7368	0.5294	0.0833	0.4500	**1.0000**	0.3793	0.3000	0.9697	0.6087	0.0000	0.2174
A11	0.4737	0.5882	0.7500	0.3500	0.8000	0.4138	0.2000	**1.0000**	0.4348	0.3333	0.3043
A12	0.9474	**1.0000**	**1.0000**	0.8500	0.6923	**1.0000**	0.3000	0.3030	0.3043	0.2222	0.6957
A13	0.3947	0.5882	0.4167	0.0000	0.9538	0.3448	0.2000	0.8182	0.2609	0.0000	0.4348
AI	1	1	1	1	1	1	1	1	1	1	1

Table 6. Weighted Normalized Matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
AAI	0.041053	0.015294	0.0125	0	0.061538	0.018621	0	0.021212	0.007826	0	0.008696
A1	0.0411	0.0918	0.1125	0.0700	0.0677	0.0186	0.0400	0.0339	0.0104	0.0222	0.0139
A2	0.0924	0.0459	0.0250	0.0350	0.0846	0.0528	0.0480	0.0615	0.0261	0.0056	0.0157
A3	0.0821	0.1147	0.0500	0.0700	0.0800	0.0466	0.0320	0.0318	0.0470	0.0222	0.0191
A4	0.1300	0.0688	0.0500	0.0600	0.0723	0.0652	0.0080	0.0467	0.0417	0.0111	0.0157
A5	0.0650	0.0612	0.0563	0.0400	0.0923	0.0403	0.0320	0.0615	0.0261	0.0167	0.0104
A6	0.0582	0.0765	0.0813	0.0250	0.0615	0.0186	0.0000	0.0679	0.0078	0.0500	0.0243
A7	0.1300	0.0918	0.0438	0.0950	0.0800	0.0776	0.0800	0.0530	0.0600	0.0222	0.0400
A8	0.1232	0.0688	0.0813	0.0500	0.0662	0.0528	0.0000	0.0339	0.0183	0.0333	0.0330
A9	0.0650	0.0459	0.0375	0.1000	0.0754	0.0372	0.0720	0.0339	0.0261	0.0333	0.0157
A10	0.0958	0.0688	0.0125	0.0450	0.1000	0.0341	0.0240	0.0679	0.0365	0.0000	0.0087
A11	0.0616	0.0765	0.1125	0.0350	0.0800	0.0372	0.0160	0.0700	0.0261	0.0167	0.0122
A12	0.1232	0.1300	0.1500	0.0850	0.0692	0.0900	0.0240	0.0212	0.0183	0.0111	0.0278
A13	0.0513	0.0765	0.0625	0.0000	0.0954	0.0310	0.0160	0.0573	0.0157	0.0000	0.0174
AI	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04

Table 7. Results of the MARCOS Method

		Si	Ki-	Ki+	f(K-)	f(K+)	f(K)		Ranking
	AAI	0.1867							
Banking and financial services	**A1**	0.5221	2.7961	0.5221	0.1574	0.8426	0.5072	0.5072	**8**
Production	**A2**	0.4924	2.6370	0.4924	0.1574	0.8426	0.4784	0.4784	**11**
Government and public administrations	**A3**	0.5955	3.1889	0.5955	0.1574	0.8426	0.5785	0.5785	**3**
Health care	**A4**	0.5695	3.0496	0.5695	0.1574	0.8426	0.5532	0.5532	**4**
Energy	**A5**	0.5018	2.6871	0.5018	0.1574	0.8426	0.4875	0.4875	**9**
Retail	**A6**	0.4711	2.5227	0.4711	0.1574	0.8426	0.4576	0.4576	**12**
Construction	**A7**	0.7734	4.1413	0.7734	0.1574	0.8426	0.7513	**0.7513**	**1**
Education	**A8**	0.5607	3.0027	0.5607	0.1574	0.8426	0.5447	0.5447	**5**
Insurance	**A9**	0.5420	2.9025	0.5420	0.1574	0.8426	0.5265	0.5265	**7**
Technology	**A10**	0.4933	2.6419	0.4933	0.1574	0.8426	0.4793	0.4793	**10**
Transport and storage	**A11**	0.5437	2.9116	0.5437	0.1574	0.8426	0.5282	0.5282	**6**
Religious, charitable, or social services	**A12**	0.7498	4.0152	0.7498	0.1574	0.8426	0.7284	0.7284	**2**
Information	**A13**	0.4230	2.2653	0.4230	0.1574	0.8426	0.4109	0.4109	**13**
	AI	1.0000							

According to the results of the SWARA-MARCOS method, the top five industries for occupational fraud include: Construction, Religious, charitable, or social services, Government and Public Administration, Health Care, and Education. Occupational fraud is on the rise in construction. The least occupational fraud is in the information industry. There are small occupational scams in retail. The key question is how to suppress or

minimize occupational fraud in various industries. This can be achieved by controlling billing, cash theft, cash-on-hand payments, unauthorized check, and payment tampering, corruption, expense reimbursement, financial statement fraud, non-cash payments, payroll, registered payments, and skimming. External audits, internal audits, state audits, and forensic accounting and auditing play significant roles. Digitization of the entire business has a positive effect on the suppression of occupational fraud. It is necessary to continuously develop ethical values for all participants in the value chain.

Occupational Fraud in High-Risk Departments

The most common fraud schemes at work in high-risk departments are presented in Table 8.

Table 8. What are the most common fraud schemes at work in high-risk departments? (in %)

	Occupational fraud										
Department	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**
A1	22	7	10	8	44	13	2	20	12	2	8
A2	33	19	17	32	36	21	9	16	15	6	21
A3	13	9	7	4	49	7	4	20	4	2	12
A4	10	11	15	12	40	6	2	25	3	3	10
A5	33	11	10	14	65	24	11	18	16	4	8
A6	33	8	6	4	79	6	4	21	4	3	5
A7	31	15	19	15	46	17	4	18	10	4	20
A8	20	23	24	22	45	17	11	11	11	4	13

Department		**Occupational fraud**	
A1	Operations	**C1.**	Billing
A2	Accounting	**C2.**	Cash theft
A3	Sales	**C3.**	Cash on hand
A4	Customer service	**C4.**	Check and payment interference
A5	Executive/upper management	**C5.**	Corruption
A6	Procurement	**C6.**	Expense reimbursements
A7	Administrative support	**C7.**	Financial reporting fraud
A8	Finance	**C8.**	No cash
		C9.	Payroll
		C10.	Register payments
		C11.	Skimming

Source: Occupational Fraud 2024: A Report to the Nations. Association of Certified Fraud Examiners – ACFE

In the analysis of occupational fraud in high-risk departments, the same criteria were used as in the previous case and their calculated weight coefficients using the SWARA method. The ranking of alternatives (departments) was performed using the MARCOS method. Tables 9 - 13 show the calculation and results of the MARCOS method.

Table 9. Initial Matrix

Weight of criteria	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04
Kind of criteria	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
A1	22	7	10	8	44	13	2	20	12	2	8
A2	33	19	17	32	36	21	9	16	15	6	21
A3	13	9	7	4	49	7	4	20	4	2	12
A4	10	11	15	12	40	6	2	25	3	3	10
A5	33	11	10	14	65	24	11	18	16	4	8
A6	33	8	6	4	79	6	4	21	4	3	5
A7	31	15	19	15	46	17	4	18	10	4	20
A8	20	23	24	22	45	17	11	11	11	4	13
MAX	33	23	24	32	79	24	11	25	16	6	21
MIN	10	7	6	4	36	6	2	11	3	2	5

Table 10. Extended Initial Matrix

Weight of criteria	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04
Kind of criteria	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
AAI	10	7	6	4	36	6	2	11	3	2	5
A1	22	7	10	8	44	13	2	20	12	2	8
A2	33	19	17	32	36	21	9	16	15	6	21
A3	13	9	7	4	49	7	4	20	4	2	12
A4	10	11	15	12	40	6	2	25	3	3	10
A5	33	11	10	14	65	24	11	18	16	4	8
A6	33	8	6	4	79	6	4	21	4	3	5
A7	31	15	19	15	46	17	4	18	10	4	20
A8	20	23	24	22	45	17	11	11	11	4	13
AI	33	23	24	32	79	24	11	25	16	6	21

Table 11. Normalized Matrix

Weight of criteria	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04
Kind of criteria	1	1	1	1	1	1	1	1	1	1	1
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
AAI	0.30303	0.304348	0.25	0.125	0.455696	0.25	0.181818	0.44	0.1875	0.333333	0.238095
A1	0.6667	0.3043	0.4167	0.2500	0.5570	0.5417	0.1818	0.8000	0.7500	0.3333	0.3810
A2	**1.0000**	0.8261	0.7083	**1.0000**	0.4557	0.8750	0.8182	0.6400	0.9375	**1.0000**	**1.0000**
A3	0.3939	0.3913	0.2917	0.1250	0.6203	0.2917	0.3636	0.8000	0.2500	0.3333	0.5714
A4	0.3030	0.4783	0.6250	0.3750	0.5063	0.2500	0.1818	**1.0000**	0.1875	0.5000	0.4762
A5	**1.0000**	0.4783	0.4167	0.4375	0.8228	**1.0000**	**1.0000**	0.7200	**1.0000**	0.6667	0.3810
A6	**1.0000**	0.3478	0.2500	0.1250	**1.0000**	0.2500	0.3636	0.8400	0.2500	0.5000	0.2381
A7	0.9394	0.6522	0.7917	0.4688	0.5823	0.7083	0.3636	0.7200	0.6250	0.6667	0.9524
A8	0.6061	**1.0000**	**1.0000**	0.6875	0.5696	0.7083	**1.0000**	0.4400	0.6875	0.6667	0.6190
AI	1	1	1	1	1	1	1	1	1	1	1

Table 12. Weighted Normalized Matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
AAI	0.039394	0.039565	0.0375	0.0125	0.04557	0.0225	0.014545	0.0308	0.01125	0.016667	0.009524
A1	0.0867	0.0396	0.0625	0.0250	0.0557	0.0488	0.0145	0.0560	0.0450	0.0167	0.0152
A2	0.1300	0.1074	0.1063	0.1000	0.0456	0.0788	0.0655	0.0448	0.0563	0.0500	0.0400
A3	0.0512	0.0509	0.0438	0.0125	0.0620	0.0263	0.0291	0.0560	0.0150	0.0167	0.0229
A4	0.0394	0.0622	0.0938	0.0375	0.0506	0.0225	0.0145	0.0700	0.0113	0.0250	0.0190
A5	0.1300	0.0622	0.0625	0.0438	0.0823	0.0900	0.0800	0.0504	0.0600	0.0333	0.0152
A6	0.1300	0.0452	0.0375	0.0125	0.1000	0.0225	0.0291	0.0588	0.0150	0.0250	0.0095
A7	0.1221	0.0848	0.1188	0.0469	0.0582	0.0638	0.0291	0.0504	0.0375	0.0333	0.0381
A8	0.0788	0.1300	0.1500	0.0688	0.0570	0.0638	0.0800	0.0308	0.0413	0.0333	0.0248
AI	0.13	0.13	0.15	0.1	0.1	0.09	0.08	0.07	0.06	0.05	0.04

Table 13. Results of the MARCOS Method

		Si	Ki-	Ki+	f(K-)	f(K+)	f(K)		Ranking
	AAI	0.2798							
Operations	**A1**	0.4656	1.6641	0.4656	0.2186	0.7814	0.4388	0.4388	6
Accounting	**A2**	0.8245	2.9465	0.8245	0.2186	0.7814	0.7769	**0.7769**	**1**
Sales	**A3**	0.3862	1.3803	0.3862	0.2186	0.7814	0.3640	0.3640	8
Customer service	**A4**	0.4458	1.5932	0.4458	0.2186	0.7814	0.4201	0.4201	7
Executive/upper management	**A5**	0.7097	2.5362	0.7097	0.2186	0.7814	0.6688	0.6688	3
Procurement	**A6**	0.4851	1.7338	0.4851	0.2186	0.7814	0.4572	0.4572	5
Administrative support	**A7**	0.6829	2.4406	0.6829	0.2186	0.7814	0.6436	0.6436	4
Finance	**A8**	0.7584	2.7103	0.7584	0.2186	0.7814	0.7147	0.7147	2
	AI	1.0000							

According to the results of the SWARA-MARCOS method, occupational fraud is most prevalent in accounting, followed by finance. Other affected departments include Executive/Senior Management, Administrative Support, Procurement, Operations, Customer Service, and Sales. Occupational fraud is least common in sales. Effective control of the accounting process and financial activities can significantly reduce occupational fraud. External audits, internal audits, forensic accounting, and auditing play a significant role in this. The impact of digitizing accounting and financial operations is also noteworthy. Ethical standards in accounting and finance are crucial.

CONCLUSION

Recently, occupational fraud has increasingly affected the performance of all entities. Therefore, researching it from different angles is highly challenging. This study evaluates occupational fraud in various industries and high-risk departments using the SWARA and MARCOS methods. The results indicate that the top five industries for occupational fraud include

construction, religious, charitable, or social services, government and public administration, health care, and education. Occupational fraud is most prevalent in the construction industry, while the information industry experiences the least fraud. Retail has a relatively low incidence of occupational fraud. The key question is how to suppress or minimize occupational fraud across various industries. This can be achieved through more effective control of collections, cash theft, cash-on-hand disbursements, unauthorized check and payment tampering, corruption, reimbursement fraud, financial statement fraud, cashless payments, payroll fraud, registered payments, and skimming. External audits, internal audits, state audits, and forensic accounting and auditing play significant roles. The digitization of entire business operations has a positive effect on fraud prevention. It is also necessary to foster ethical values among all participants in the value chain, which positively impacts the overall performance of entities.

According to the SWARA-MARCOS method, occupational fraud is most common in accounting, followed by finance. Other affected departments include Executive/Senior Management, Administrative Support, Procurement, Operations, Customer Service, and Sales. Occupational fraud is least prevalent in sales. Effective control of the accounting process and financial activities can significantly reduce occupational fraud. External audits, internal audits, forensic accounting, and auditing play crucial roles in this regard. The impact of digitizing accounting and financial operations is also noteworthy. Upholding ethical standards in accounting and finance is essential.

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Analiza profesionalnih prevara na osnovu SWARA i MARCOS metode

Rezime: U poslednje vreme, profesionalne prevare postale su izraženije, što njihovo istraživanje čini veoma izazovnim. Ova studija istražuje profesionalne prevare u različitim industrijama i visokorizičnim odeljenjima koristeći metode SWARA i MARCOS. Istraživanje je pokazalo da, prema rezultatima metode SWARA-MARCOS, pet sektora s najvećim brojem profesionalnih prevara uključuje građevinarstvo, verske, humanitarne ili socijalne službe, državnu i javnu administraciju, zdravstvenu zaštitu i obrazovanje. Profesionalne prevare su najzastupljenije u sektoru građevinarstva, dok ih u informacionoj industriji ima najmanje. U maloprodaji je stopa profesionalnih prevara relativno niska. Ključno pitanje je kako suzbiti ili minimizirati profesionalne prevare u različitim sektorima. To se može postići efikasnijom kontrolom naplata, krađe gotovine, isplata gotovine na ruke, neovlašćenih izmena čekova i plaćanja, korupcije, lažnih nadoknada troškova, prevara u finansijskim izveštajima, bezgotovinskih plaćanja, zloupotreba pri obračunu plata, registrovanih plaćanja i prisvajanja novca (skimming). Spoljne revizije, interne revizije, državne revizije, kao i forenzičko računovodstvo i revizija, igraju značajnu ulogu u sprečavanju prevara. Pored toga, digitalizacija celokupnog poslovanja ima pozitivan efekat na suzbijanje profesionalnih prevara. Neophodno je razvijati etičke vrednosti među svim učesnicima u lancu vrednosti. Što se tiče profesionalnih prevara u visokorizičnim odeljenjima, prema rezultatima metode SWARA-MARCOS, najveći nivo profesionalnih prevara prisutan je u računovodstvu, zatim u finansijama. Ostala pogođena odeljenja uključuju izvršno/starije rukovodstvo, administrativnu podršku, nabavku, operacije, korisničku službu i prodaju. Profesionalne prevare su najmanje zastupljene u sektoru prodaje. Efikasna kontrola računovodstvenih procesa i finansijskih aktivnosti može značajno smanjiti profesionalne prevare. Spoljna revizija, interna revizija, forenzičko računovodstvo i revizija imaju ključnu ulogu u tom procesu. Takođe, uticaj digitalizacije računovodstvenih i finansijskih operacija je značajan. Pored toga, održavanje visokih etičkih standarda u računovodstvu i finansijama od suštinskog je značaja.

Ključne reči: profesionalne prevare, industrija, odeljenja, SWARA, MARCOS

Milorad Stamenović[1]

ORIGINAL RESEARCH PAPER
UDC 005.96

DOI: 10.46793/Rev25109.053S
Received: 23.02.2025.
Accepted: 25.03.2025.
Published: 31.03.2025.

Organizational Empowerment: Theory and Research Directions

Summary: *Organisational empowerment (OE) is a vital research area that moves beyond individual-level analyses to examine the structural, procedural, and systemic mechanisms that enhance collective. While early studies focused primarily on psychological empowerment, the organisational dimension remains underexplored, necessitating the development of robust conceptual frameworks and measurement tools across intraorganizational, interorganizational, and extraorganizational levels. However, the field faces challenges, including the dominance of psychological empowerment, inconsistent terminology, and a lack of empirical validation. To strengthen the theoretical and practical impact of OE, future research must refine its conceptual clarity, integrate diverse methodological approaches, ensuring its role as a transformative force in organisational and community development. In this paper we are reviewing main theories and concepts showing extended Peterson and Zimmerman nomological network and contributing to discussion about delineation of theorethical and methodological approach through extensive literature search.*

Keywords: *Organisational Empowerment, Empowerment Theory, Conceptual Frameworks, Nomological network, Methodology*

[1] Ergomed Clinical Research SAS, Paris, France.
E-mail: m.stamenovic@rocketmail.com

INTRODUCTION

When choosing theoretical directions for OE research, scholars must consider the organisational context, research objectives, and methodological feasibility. Methodological approaches in OE research also depend on theoretical orientation. Qualitative methods such as ethnography, case studies, and narrative analysis are useful for exploring empowerment processes and experiences, particularly within critical and institutional frameworks. These methods allow for an in-depth examination of organisational cultures, leadership practices, and employee perceptions. Conversely, quantitative approaches, including surveys, experiments, and structural equation modeling, provide empirical validation of empowerment constructs. They are particularly useful for testing hypotheses derived from social cognitive, transformational leadership, and systems theories among others. A mixed-methods approach can offer a comprehensive analysis, combining the depth of qualitative research with the generalisability of quantitative studies. Validation remains a critical challenge in OE research. The lack of standardised measurement tools has led to inconsistencies in assessing empowerment across different organisational contexts. Future research should focus on developing reliable and context-specific instruments to measure OE across various levels. One approach to validation involves testing empowerment models across diverse organisational settings to ensure their applicability. Cross-cultural studies, for example, can help determine whether theoretical models of OE hold across different industries and cultural environments. Another validation strategy is longitudinal research, which examines how empowerment evolves over time. This method is particularly useful for assessing the sustainability of empowerment interventions and their long-term impact on organisational effectiveness. The terminology surrounding empowerment remains an ongoing challenge. The concept is often conflated with related terms such as capacity building, social capital, and community engagement, leading to definitional ambiguities. Establishing clear distinctions among these terms is essential for theoretical clarity and methodological precision. Different disciplines use empowerment in varied ways, contributing to its conceptual fluidity. In psychology, empowerment is often understood in terms of individual agency and self-efficacy, while in sociology, it emphasises collective action and structural transformation. Organisational studies, meanwhile, frame empowerment as a function of leadership, workplace autonomy, and participatory governance. The practical implications of OE research extend to policy-making and organisational development. By refining empowerment frameworks, researchers can provide actionable insights for improving workplace policies, leadership training, and employee engagement strategies. Additionally, OE research has the potential to enhance organisational sustainability by fostering adaptive and resilient work environments. Organisations that effectively implement empowerment strategies tend to exhibit higher levels of innovation, employee satisfaction, and operational efficiency. A critical consideration in advancing OE research is addressing the limitations of existing models. The predominance of psychological empowerment in research has led to an

individualistic bias, which fails to capture the collective dimensions of empowerment. Future studies should integrate broader organisational and community-level perspectives. Another key challenge is ensuring that empowerment research does not merely serve as an academic exercise but translates into real-world applications. Collaborative research involving practitioners, policymakers, and community stakeholders can bridge the gap between theory and practice, ensuring that empowerment initiatives lead to tangible improvements in organisational effectiveness.

As empowerment research continues to evolve, interdisciplinary approaches will be crucial in refining its theoretical foundations. Integrating perspectives from management, psychology, sociology, and public policy can yield a more holistic understanding of organisational empowerment and its broader societal implications. Organisational empowerment research requires a multidimensional approach that incorporates diverse theories, methodological innovations, and rigorous validation strategies. By addressing terminological inconsistencies and expanding theoretical frameworks, scholars can enhance the conceptual clarity and practical relevance of OE research, ultimately contributing to more empowered and resilient organisations.

LITERATURE REVIEW

Empowerment is a dynamic and participatory process that enables individuals, organizations, and communities to increase their authority, effectiveness, and equity. (1,2) This concept plays a crucial role in community psychology, health promotion, and social work (3,4,5,6). It also provides a strategic framework for interventions in high-risk communities (7). The continued interest in empowerment theory is driven by its effectiveness in supporting social movements and interventions at multiple levels (8).

Although empowerment is inherently multilevel, early research primarily focused on individual empowerment (9). Much of the research concentrated on understanding the mechanisms of participation and evaluating individual-level empowerment (10,11, 12,13,14). However, there has been relatively less attention to the processes, structures, and outcomes related to organizational and community-level empowerment. The growing importance of organizational empowerment (OE) is therefore critical in addressing the limitations of traditional empowerment research, offering a more comprehensive understanding of empowerment within organizational settings. Zimmerman (2000) emphasizes the need to move beyond individual-focused interventions to explore the broader organizational context.

The shift toward examining OE is necessary to counter the individualistic bias that has characterized traditional empowerment theory (15). By incorporating collective principles, OE provides a more nuanced framework for understanding empowerment within organizational settings (16). To advance this field, it is crucial to develop robust conceptual frameworks and measurement strategies for OE. Recent research efforts have begun to

address these gaps, following the foundational model established in 2004. These studies propose frameworks for understanding OE at intraorganizational, interorganizational, and extraorganizational levels (17, 18, 14, 19, 20, 21, 22, 23, 24). These studies also aim to provide actionable insights to further conceptualize and understand OE. Zimmerman and Peterson's (2004) pioneering work on OE continues to influence the field, with their nomological network describing the key features and interconnections of OE. This network remains a critical foundation for future research and practical applications, highlighting the need for ongoing development of tailored measures and interventions that cater to organizational contexts. The continued exploration of OE across multiple organizational levels will deepen our understanding of empowerment and its transformative potential in diverse settings.

On the other hand, there are differing perspectives on the understanding of organizational empowerment, as highlighted by Peterson (2014), who argues that empowerment remains largely an untested theory. Christens (2012) emphasized that higher-order, multidimensional empowerment models have rarely been empirically validated. Additionally, he pointed out the need for more context-specific, quantitative instruments that can be developed and validated to measure empowerment across different populations. These gaps have raised concerns among researchers regarding the future trajectory of empowerment theory, research, and practice. They also warned that unless both theoretical and empirical issues are addressed with greater precision, the continued significance of empowerment as a key area of focus may be at risk. Peterson (2014) advocates for exploring alternatives to the traditional superordinate model of empowerment, where various dimensions are typically seen as manifestations of a higher-order construct. The aggregate model of empowerment offers a promising alternative, conceptualizing empowerment as a higher-order construct formed by its distinct dimensions. While much of the discussion has been centered on psychological empowerment (PE), these insights are also relevant to research on organizational and community empowerment. Researchers, at any level of analysis, must pay closer attention to measurement perspectives and provide clear justifications for their specific conceptualizations of empowerment as a multidimensional construct (25).

Furthermore, empowerment, as a higher-order multidimensional construct, is transitioning from its traditional focus on social and political change to a more individualistic interpretation, possibly reflecting the influence of neoliberal ideas on health promotion. (27, 28) Practitioners and scholars in this field often use the term loosely, leading to a proliferation of definitions and the frequent interchangeability of empowerment with other concepts such as community, capacity, competence, social capital, and cohesiveness. This blending of terms can obscure the original focus on "power," with some scholars arguing that the concept has become diluted.

Empowerment is inherently complex, encompassing processes and outcomes for both individuals and communities, making efforts to define it clearly even more challenging. The lack of a universally accepted definition can be traced to the term's development across various disciplines, such as health education, psychology, social work, and

sociology. Essentially, the inconsistent evolution of empowerment discourse in global health promotion has led to frequent misinterpretations. For instance, some view empowerment as a "Eurocentric phenomenon," likely due to its central role in the WHO European Healthy Cities program of the late 1980s and the significant academic attention it has received from European scholars (28). In contrast, while empowerment and community development strategies have long been central in Africa, there is still limited academic commentary from the continent. In many Asian countries, empowerment remains a relatively new concept. Despite these definitional challenges, empowerment continues to be recognized as a valuable element of health promotion across disciplines. Similar to health promotion, which also lacks a universally accepted definition, empowerment remains ambiguous in contemporary literature and is applied and understood differently worldwide (28).

Achieving greater clarity and precision in defining and applying the concept of empowerment is essential for ensuring that practitioners can accurately measure it at both the individual and community levels. A more precise understanding will help clarify the various dimensions of empowerment and how they manifest in different contexts, enabling practitioners to implement more effective strategies and interventions.

This clarity is crucial for advancing research and practical applications, as it ensures that empowerment is measured consistently and meaningfully across different settings. By refining the conceptual framework, researchers can better assess the impact of empowerment initiatives, providing valuable insights for improving both individual and community well-being.

METHODOLOGY

In this paper, we aim to contribute to the ongoing discourse on Organizational Empowerment (OE) by reviewing the main theories and concepts that form its foundation. Our goal is to clarify the theoretical frameworks and methodological approaches currently employed in OE research. By conducting an extensive literature review, we examine the existing strengths and weaknesses of these frameworks, providing a comprehensive overview of where the field stands today. This review will help identify key areas that require further investigation and offer valuable insights for refining the current understanding of OE. Despite the substantial body of work that has been published, several aspects of OE remain underexplored, particularly at the intraorganizational and interorganizational levels. Through this review, we seek to highlight these gaps and provide recommendations for future research that will address the complexities of OE across various organizational settings. By doing so, we hope to foster a deeper understanding of the processes, structures, and outcomes that constitute organizational empowerment.

The research presented here is a updated segment of a doctoral dissertation conducted at IAE Nice (Institut d'administration des entreprises de Nice), where we explored the

challenging intersection of organizational empowerment and patient engagement. This context-specific exploration adds additional dimension to the broader OE discourse.

Through this paper, we contribute to the evolving narrative of OE research, emphasizing the need for methodological refinement and a clearer conceptualization of the construct. Our analysis of current and potential research directions is intended to provide a roadmap for future studies in the field. By synthesizing existing knowledge and proposing a more refined approach to OE research, we aim to ensure that the concept remains a transformative force in both organizational and community development, with the potential for broader applications across diverse sectors.

Another crucial aspect of strengthening OE research is the integration of diverse methodological approaches. The study of OE requires a comprehensive understanding of its various dimensions, and different research methodologies are necessary to capture this complexity. Combining qualitative and quantitative approaches, such as case studies, interviews, surveys, and statistical modeling, will allow researchers to explore both the lived experiences of individuals within organizations and the broader systemic structures that influence empowerment. A mixed-methods approach can help provide a more complete picture of how empowerment operates within organizational contexts, ultimately improving the applicability and validity of OE research.

In addition to refining conceptual clarity and integrating diverse methods, future research must maintain a critical focus on power dynamics within organizations. Investigating power dynamics in OE research can reveal important insights into the barriers and facilitators of empowerment, helping to identify where interventions may be most needed to promote organizational change and development.

RESULTS AND DISCUSSION

Recent reviews and empirical studies have continued to refine and expand the concept of Organizational Empowerment (OE) within the framework established by Peterson and Zimmerman's nomological network. Developing robust methods to validate and assess OE will be essential for designing effective interventions and achieving organizational goals as the field evolves. These efforts will help bridge the gap between theoretical frameworks and practical applications in diverse organizational settings. While early empowerment theory primarily focused on individual-level analysis, particularly during the 1980s and 1990s, more recent research emphasizes the need to broaden this focus to encompass organizational and community contexts. By addressing these wider levels, researchers can gain a deeper understanding of empowerment and its implications for improving organizational performance and impact.

It is important to note that the higher-order multidimensional construct proposed by Peterson (2014) is primarily associated with psychological empowerment (PE), rather than organizational empowerment (OE). However, Peterson's work also reflects similar themes

and the growing recognition of the importance of shifting toward a multidimensional approach. This perspective highlights the need for a more comprehensive understanding of empowerment that includes multiple levels of analysis, which is crucial for exploring its full impact on both individuals and organizations. As OE research continues to evolve, integrating these broader conceptualizations will be key to developing more effective empowerment strategies that can enhance both individual and organizational outcomes.

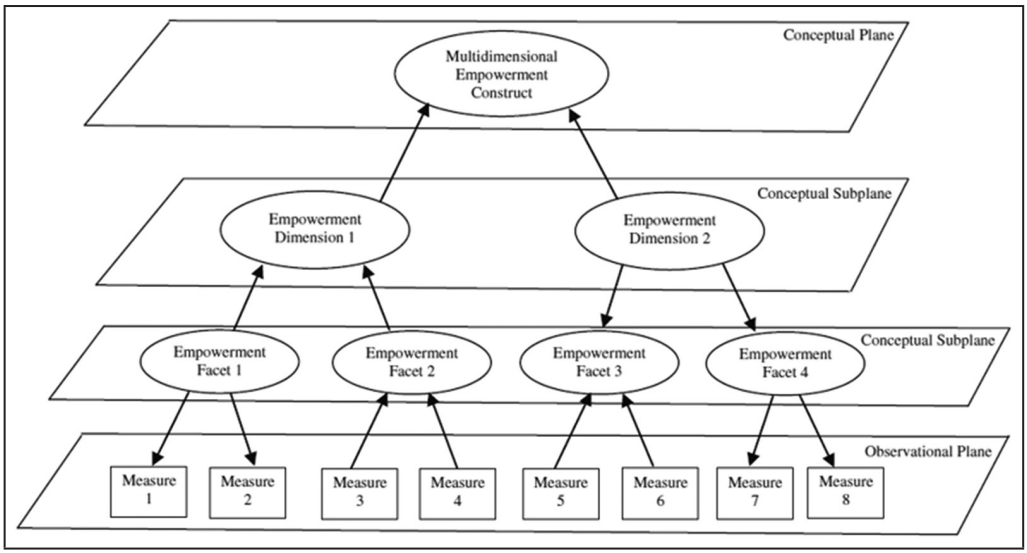

Figure 1. The higher-order multidimensional construct proposed by N.A. Peterson (2014), adapted from MacKenzie et al. (2005) (25,27)

Organizational Empowerment (OE) offers a valuable approach to counter the misconception that empowerment theory is primarily individualistic and conflict-driven (15). By incorporating collective principles, OE provides a broader and more comprehensive framework for understanding empowerment within organizational settings (16). To fully explore OE, it is essential to develop clear conceptual frameworks that define its key attributes, guide its measurement, and offer practical strategies for implementation.

Zimmerman and Peterson's work marks a significant advancement in developing a conceptual model of OE. Although earlier research by Zimmerman (2000) addressed empowerment across multiple levels of analysis, it did not specifically focus on OE. The nomological network they introduced defines OE and its components, integrating them into a cohesive model. This model has major implications for both future research and practical applications, offering a foundation for the creation of new measures and interventions tailored to organizational contexts.

For example, applying the OE framework to community-based organizations can support initiatives like substance abuse prevention. Researchers can empirically validate OE by examining its relationship with goal achievement, such as reductions in substance

abuse within targeted communities. This approach emphasizes the importance of refining and conceptualizing OE to better align with real-world applications.

Building on the nomological network, our research framework argues that qualitative research plays a crucial role in further conceptualizing OE. It also addresses the potential limitations of the model, as highlighted by Peterson (2014) and others. This network outlines the key features, observable manifestations, and interconnections of OE. Zimmerman and Peterson's work provides a solid foundation for understanding organizational-level features that characterize empowered organizations, guiding future studies in the field.

Table 1. Nomological network according to Petterson and Zimmerman (2004)

Component	Processes	Outcomes
Intraorganizational	- Incentive management (Prestby, Wandersman, Florin, Rich, & Chavis, 1990) - Subgroup linkages (Bond & Keys, 1993) - Opportunity role structure (Maton & Salem, 1995; Minkler et al., 2001; Peterson & Hughey, 2002; Peterson & Speer, 2000; Speer Hughey, Gersheimer, & Adams-Lavitt, 1995) - Leadership (Maton & Salem, 1995; Minkler et al., 2001) - Social support (Gutiérrez et al., 1995; Kieffer, 1984; Maton, 1988; Maton & Salem, 1995; Minkler et al., 2001; Peterson & Hughey, 2002; Peterson & Speer, 2000) - Group-based belief system (Maton & Salem, 1995; Minkler et al., 2001; Rappaport, 1993; Spreitzer, 1995)	- Viability (Perkins, Brown & Taylor, 1996; Prestby et al., 1990) - Underpopulated settings (Zimmerman et al., 1991) - Collaboration of coempowered subgroups (Bond & Keys, 1993; Gruber & Trickett, 1987) - Resolved ideological conflict (Riger, 1984) - Resource identification (Zimmerman et al., 1991)
Interorganizational	- Accessing social networks of other organizations (Gulati & Gargiulo, 1999; Snow, Zurcher, & Ekind-Olson, 1980) - Participating in alliance-building activities with other organizations (Foster-Fishman, Salem, Allen, & Fahrbach, 2001; Itzhaky & York, 2002)	- Collaboration (Bartle et al., 2002; Baum & Oliver, 1991; Checkoway, 1982; Checkoway & Doyle, 1980; Orians, Liebow, & Branch, 1995) - Resource improvement (Zimmerman et al., 1991)
Extraorganizational	- Implementing community actions (Speer et al., 1995; Speer & Hughey, 1995) - Disseminating information (Bonal, 2000; Burstein, 1999; Stevenson & Greenberg, 2000)	- Influence of public policy and practice (Fawcett et al., 1995; Speer & Hughey, 1996) - Creation of alternative settings and programs (Chertis & Deegan, 2001; Minkler et al., 2001; Sarason, 1972) - Deployment of resources in the community (Zimmerman et al., 1991)

Table 2. Adjusted nomological network through literature search and systematisation

Component	Processes	Outcomes
Intraorganizational	- Incentive management (Prestby, Wandersman, Florin, Rich, & Chavis, 1990) - Subgroup linkages (Bond & Keys, 1993) - Opportunity role structure (Maton & Salem, 1995; Minkler et al., 2001; Peterson & Hughey, 2002; Peterson & Speer, 2000; Speer Hughey, Gersheimer, & Adams-Lavitt, 1995) - Leadership (Maton & Salem, 1995; Minkler et al., 2001) - Social support (Gutiérrez et al., 1995; Kieffer, 1984; Maton, 1988; Maton & Salem, 1995; Minkler et al., 2001; Peterson & Hughey, 2002; Peterson & Speer, 2000) - Group-based belief system (Maton & Salem, 1995; Minkler et al., 2001; Rappaport, 1993; Spreitzer, 1995) - **team empowerment (added process) (Yiannakis et al., 2006; Janssen et al., 2015)**	- Viability (Perkins, Brown & Taylor, 1996; Prestby et al., 1990) - Underpopulated settings (Zimmerman et al., 1991) - Collaboration of coempowered subgroups (Bond & Keys, 1993; Gruber & Trickett, 1987) - Resolved ideological conflict (Riger, 1984) - Resource identification (Zimmerman et al., 1991) - **Organizational commitment (Forenza, 2016, 2017; Valsania et al., 2016). (added Outome)** - **Sense of community (SOC) (added outcome) (Hughey et al., 2008; Speer et al., 2013).**
Interorganizational	- Accessing social networks of other organizations (Gulati & Gargiulo, 1999; Snow, Zurcher, & Ekind-Olson, 1980) - Participating in alliance-building activities with other organizations (Foster-Fishman, Salem, Allen, & Fahrbach, 2001; Itzhaky & York, 2002) - **organizational learning (Maton (2008,))(added process)**	- Collaboration (Bartle et al., 2002; Baum & Oliver, 1991; Checkoway, 1982; Checkoway & Doyle, 1980; Orians, Liebow, & Branch, 1995) - Resource improvement (Zimmerman et al., 1991)
Extraorganizational	- Implementing community actions (Speer et al., 1995; Speer & Hughey, 1995) - Disseminating information (Bonal, 2000; Burstein, 1999; Stevenson & Greenberg, 2000)	- Influence of public policy and practice (Fawcett et al., 1995; Speer & Hughey, 1996) - Creation of alternative settings and programs (Chertis & Deegan, 2001; Minkler et al., 2001; Sarason, 1972) - Deployment of resources in the community (Zimmerman et al., 1991)

Following the successful development of the nomological network for Organizational Empowerment (OE) by Zimmerman and Peterson (2004), subsequent scholars have continued to explore similar themes. Our literature review reveals additional studies that contribute to the ongoing discussion of OE components. While further research is needed on all components, there is a specific need to investigate intraorganizational outcomes

and the inter- and extraorganizational elements. This gap may stem from the inherent complexity of these components, which can pose challenges for researchers. Additionally, there has likely been an overemphasis on the initial component, resulting in insufficient exploration of the other two.

Current research has predominantly relied on quantitative methods, which may not fully capture the nuanced insights that qualitative approaches could provide, particularly in understanding how professionals achieve empowerment and the role organizational factors play in this process (22). The abstract nature of OE components also raises questions about how the model adapts to the fluid and dynamic characteristics of organizations. Thus, further research is needed to explore the relationships between the processes and outcomes of each OE component, as well as their interactions across different components.

Preliminary findings suggest a potential link between viability and alliance building, which highlights the need to examine additional connections within the OE model. It is essential to identify and prioritize the most significant processes and outcomes, and to assess how newly introduced components impact and interrelate with each other. This will provide a more comprehensive understanding of OE and its application in organizational settings.

While participation is a crucial element of empowerment, it is only implicitly addressed within the current OE framework, with limited exploration in the literature. Future research should focus on clarifying how the processes outlined in the OE model affect participation, given its foundational role in empowerment. The framework developed by Depauw and Driessens (2016) offers valuable insights for integrating and examining participation more thoroughly within the OE model. (29)

The current Organizational Empowerment (OE) model emphasizes how organizations influence public policy and practice through extraorganizational empowerment. However, it overlooks how organizations respond to institutional demands and create new institutions to serve their interests (29). This gap reflects a disconnect between OE and organizational theories. Franscescato and Aber (2015) stress the need to incorporate organizational theory into OE.(30) Institutional theory, in particular, provides a useful framework for analyzing how organizations and professionals interact with and shape their institutional environments, offering a potential opportunity to bridge organizational theories with OE. (31) Further studies have explored the relationships between empowerment-related constructs and their outcomes and have connected empowerment constructs with those from other theoretical perspectives (11, 17, 18, 32).

A deeper review of the literature, including work by Rothman and Vijlder (2019), has identified additional processes and outcomes that enhance the original model proposed by Zimmerman and Peterson. For example, intraorganizational empowerment processes now include team empowerment, which is vital for promoting individual empowerment among members and improving the team's overall effectiveness as a cohesive social unit. Moreover, adopting a collaborative approach to addressing institutional and policy barriers is crucial for strengthening team empowerment. Research also indicates that diversity in management plays a significant role in enhancing the sense of community (SOC), an added

intraorganizational outcome, while access to information positively influences professional empowerment, reinforcing the findings of Hughey.(25,18)

Furthermore, a higher SOC among individuals is linked to improved organizational effectiveness. Christens and Lin (2014) found a strong connection between social support and SOC, highlighting the importance of social networks in fostering empowerment within organizations.(22) Opportunity role structures also have a positive indirect and direct impact on SOC, and they directly predict perceived effectiveness, with an indirect effect through SOC (25). These insights underscore the importance of incorporating diverse factors, such as team dynamics, diversity, and role structures, into the broader OE framework to enhance its applicability and effectiveness across organizational contexts.

Within the intraorganizational component, organizational learning has emerged as an important interorganizational process, reflecting how organizations adapt and respond to environmental changes, thus enriching Organizational Empowerment (OE) (17). Integrating this aspect into the OE model provides deeper insight into the dynamic evolution of organizations and enhances our understanding of their capacity to learn and adjust over time.

The development of outcomes related to interorganizational empowerment has also been a key area of focus. Collaboration among organizations, such as coordinating services and formalizing relationships, plays a crucial role in achieving collective goals. Resource procurement, including securing finances and other external resources, significantly strengthens an organization's effectiveness. Participation in alliances provides tangible benefits, such as financial support and technical assistance. However, maintaining numerous relationships may not always be feasible due to the substantial effort required. Furthermore, accessing social networks with other organizations fosters growth and enhances the ability to influence the organizational environment. In turn, alliance-building positively impacts collaboration and access to external networks (33). The effectiveness of alliances is influenced by factors such as competent coordination, strong leadership, a supportive climate, effective information dissemination, positive interactions between the alliance and the home organization, and flexibility. These elements contribute to network formation, professional development, and cross-institutional collaboration, all of which support capacity building (34). Furthermore, empowering environments can be enhanced through the reform and restructuring of relationships into more strategic partnerships (17). At the interorganizational level, the focus should be on integrating a diverse range of empowered processes across different organizations.

In terms of extraorganizational empowerment, original processes involve implementing community actions and disseminating information to influence community policies and practices (33). These activities enhance citizen participation, particularly through engagement in social network activities. Furthermore, developing outcomes related to extraorganizational empowerment entails influencing public policy and achieving positive impacts on goals. This influence is often driven by community leadership and collective pressure (17,33). Alliances serve as intermediary structures that bring critical issues to the forefront and can evolve into broader social movements. Community participation plays a crucial role in shaping public

policy and practice, though low-income groups may experience fewer benefits in terms of political influence (22). The extent of control over local politics is often strengthened by positive organizational characteristics recognized by the community. Additionally, organizational learning strategies can impact community learning, driving transformation. Developing alternative programs and strategically allocating resources within the community are vital outcomes of Organizational Empowerment (OE), contributing to the achievement of broader social and organizational goals (17,33).

The intra- and interorganizational components provide the foundational framework for the extraorganizational component. Together, they contribute to building community capacity and influencing practice and policy through a network of interconnected. These components work synergistically, setting the stage for broader impacts within and beyond organizational boundaries.

The theoretical framework integrates elements from all three components— intraorganizational, interorganizational, and extraorganizational—based on the Zimmerman and Peterson model. These components are clearly defined, with their corresponding processes and outcomes outlined within their nomological network. Building on insights from the literature review, there are made adjustments to enhance the framework's applicability. This updated network not only incorporates recent findings but also addresses the emerging complexities in OE research, offering a more nuanced understanding of the concept.In addition to revising the nomological network, we propose a theoretical framework that emphasizes inductive research on organizational empowerment. This framework highlights the interconnectedness of the OE components, their underlying processes, and the outcomes they produce all essential for achieving organizational success. By exploring these relationships, the framework provides a comprehensive view of how OE operates within organizations and offers insights into the pathways through which empowerment leads to success. This theoretical framework serves as a valuable tool for both researchers and practitioners, offering actionable strategies to enhance organizational effectiveness through empowered practices.

CONCLUSION

The development of Organizational Empowerment (OE) has significantly advanced through the establishment of a nomological network by Zimmerman and Peterson (2004), with ongoing contributions from subsequent researchers further exploring the model. This literature review highlights the continuing evolution of OE and emphasizes that while progress has been made in some areas, much remains to be explored. In particular, further research is needed to delve deeper into the intraorganizational, interorganizational, and extraorganizational components of OE, as these areas are underexplored and present inherent complexities. These gaps in the literature are not only due to the challenging nature of these components but also the tendency of previous studies to overemphasize certain elements while neglecting others.

A major insight from the literature is the need for a balanced focus on both qualitative and quantitative research methods. While current studies have relied heavily on quantitative approaches, this has resulted in a limited understanding of how professionals achieve empowerment and the organizational factors that influence this process. Qualitative research, with its ability to provide in-depth insights into lived experiences, can reveal the nuances of how OE is enacted within organizations. It can also help address the abstract nature of the OE components and how they adapt to the dynamic and ever-changing nature of organizational environments. Moving forward, incorporating a wider range of methodologies will provide a richer, more holistic understanding of OE.

An important aspect of the OE model that requires further clarification is the concept of participation. While participation is recognized as a foundational element of empowerment, it is currently only implicitly addressed in the OE framework. More focused research is needed to examine how participation is integrated into the organizational empowerment process and how it influences empowerment at both the individual and organizational levels.

Furthermore, the existing OE model largely overlooks how organizations respond to institutional demands and shape new institutions to serve their interests. This gap is particularly relevant for extraorganizational empowerment, where organizations influence public policy and practice. However, there is little exploration of how organizations create or transform institutions to fulfill their goals. Incorporating insights from institutional theory can bridge this gap, enabling a deeper understanding of how organizations interact with their institutional environments and drive institutional change. This theoretical integration could significantly enrich the OE framework, providing a more comprehensive view of empowerment across different organizational levels.

In addition to enhancing the conceptual clarity of OE, research has also highlighted the importance of developing original outcomes related to the intraorganizational and interorganizational components. For example, team empowerment has emerged as a critical factor in promoting individual empowerment within organizations, and collaborative efforts to address institutional barriers are essential for strengthening team effectiveness. Moreover, the importance of diversity in management and access to information for professional empowerment has been reinforced. These findings emphasize the need for further research to examine the relationship between these components and to explore how factors such as social support and opportunity structure contribute to the overall empowerment process.

Research on interorganizational empowerment has also progressed, particularly regarding the role of collaboration and alliances between organizations. These alliances are essential for achieving collective goals and securing external resources, which contribute to organizational effectiveness. However, maintaining multiple relationships can be challenging, and factors such as leadership, coordination, and flexibility play a significant role in the success of these collaborations. Understanding the dynamics of interorganizational relationships will provide valuable insights into how organizations can leverage external networks for capacity building and achieve broader organizational goals.

The extraorganizational component of OE has seen developments in the context of community empowerment, particularly regarding how organizations influence public policy and drive community participation. While community leadership and activism play crucial roles in shaping public policy, there is a need to examine how organizational characteristics contribute to political influence, especially for low-income communities. Research into how organizational learning strategies impact community learning and transformation could also offer valuable insights into how organizations can help drive positive social change.

The updated version of the nomological network, as proposed in this paper, offers a comprehensive theoretical framework that reflects the latest research findings in the field of OE. By integrating these new insights, the framework addresses the complexities and challenges that have emerged in the study of OE and provides a clearer understanding of the interconnectedness between the different components. This updated network serves as a valuable tool for researchers seeking to further explore the processes and outcomes associated with OE, offering a more robust foundation for future studies.

Incorporating inductive research into the theoretical framework is another crucial step in advancing the study of OE. By focusing on the interconnectedness of the components and the outcomes they produce, this approach allows for a deeper understanding of how OE drives success within organizations. The proposed framework is designed to be adaptable to various organizational contexts, offering practical insights for both researchers and practitioners. It provides a structured approach to exploring the dynamics of empowerment and its role in achieving organizational goals, thereby fostering a more empowered and effective organizational culture.

The future of OE research depends on the continued refinement of its theoretical foundations and the development of new methodologies that can capture the complexities of organizational empowerment. By expanding the scope of research to include all components—both intraorganizational and interorganizational—the field can better address the challenges organizations face in fostering empowerment at all levels. Through a more comprehensive understanding of OE, organizations will be better equipped to create environments that promote empowerment, enhance organizational performance, and contribute to broader social and community development.

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Organizaciono osnaživanje: Teorija i pravci istraživanja

Rezime: Organizaciono osnaživanje (OE) predstavlja ključnu oblast istraživanja koja prevazilazi analize na individualnom nivou kako bi ispitala strukturalne, proceduralne i sistemske mehanizme koji unapređuju kolektivno delovanje. Dok su se rane studije prvenstveno fokusirale na psihološko osnaživanje, organizaciona dimenzija i dalje ostaje nedovoljno istražena, što zahteva razvoj snažnih konceptualnih okvira i alata za merenje na intraorganizacijskom, interorganizacijskom i ekstraorganizacijskom nivou. Međutim, ovo polje se suočava sa izazovima, uključujući dominaciju psihološkog osnaživanja, neujednačenu terminologiju i nedostatak empirijske validacije. Kako bi se ojačao teorijski i praktični uticaj OE, buduća istraživanja moraju unaprediti konceptualnu jasnoću, integrisati različite metodološke pristupe i osigurati njegovu ulogu kao transformativne sile u organizacionom i društvenom razvoju. U ovom radu analiziramo glavne teorije i koncepte, proširujući nomološku mrežu Petersona i Zimmermana i doprinosimo diskusiji o definisanju teorijskog i metodološkog pristupa zasnovanom na obimnom pretraživanje literature.

Ključne reči: organizaciono osnaživanje, teorija osnaživanja, konceptualni okviri, nomološka mreža, metodologija.

Dijana Rađo[1]

ORIGINALNI NAUČNI RAD
UDK 657.6

DOI: 10.46793/Rev25109.069R
Primljeno: 03.02.2025.
Prihvaćeno: 25.02.2025.
Objavljeno: 31.03.2025.

Pregled istraživanja faktora kvaliteta interne revizije

Summary: *Rezime: Interna revizija, kao nezavisna i objektivna funkcija, ima ključnu ulogu u unapređenju poslovanja organizacija kroz procenu i poboljšanje efektivnosti upravljanja rizicima, kontrolom i organizacionim procesima. Iako nije zakonski obavezna u svim zemljama, njeno uspostavljanje postaje sve važnije, posebno u javnom sektoru i finansijskim organizacijama i korporacijama, kako bi se unapredilo poslovanje, ostvarili ciljevi i smanjili rizici. Kvalitet interne revizije definiše se njenom sposobnošću da ispuni ciljeve organizacije pružajući korisne informacije menadžmentu, osiguravajući usklađenost s propisima, upravljajući rizicima i poboljšavajući sistem internih kontrola i organizacione procese. Njena važnost ogleda se u povećavanju kredibiliteta revizije, poverenja zainteresovanih strana i dugoročne održivosti organizacije. Ključni faktori kvaliteta uključuju profesionalne standarde, podršku menadžmenta, nezavisnost, objektivnost, kompetenciju revizora i efikasnu koordinaciju sa eksternim revizorima. Iako univerzalan model za ocenu kvaliteta interne revizije ne postoji, istraživanja naglašavaju značaj različitih metodoloških pristupa, uključujući SEM metodologiju, faktorsku analizu i regresione modele i strukturalni pregled literature radi preciznijeg razumevanja indikatora kvaliteta. U radu su prezentovana istraživanja koja se bave upravo istraživanjem kvaliteta interne revizije i identifikovanja ključnih faktora koji određuju kvalitet interne revizije.*

Ključne reči: *interna revizija, kvalitet interne revizije, faktori kvaliteta interne revizije*

[1] Univerzitet u Novom Sadu, Ekonomski fakultet u Subotici, Srbija.
E-mail: E-mail: dijana.radjo@hotmail.com

UVOD

Interna revizija predstavlja nezavisno, objektivno uveravanje i konsultantsku aktivnost stvorenu s ciljem dodavanja vrednosti i poboljšanja poslovanja organizacije. Svojim delovanjem, interna revizija pomaže organizaciji da ostvari svoje ciljeve donošenjem sistematičnog, disciplinarnog pristupa za procenu i poboljšanje efektivnosti upravljanja rizicima, kontrole i upravljanja procesima (9). S tim u vezi, interna revizija sagledava sve poslovne funkcije, aktivnosti i procese koji se odvijaju unutar organizacije. To može da uključuje usklađenost rada sa propisima i internim politikama poslovanja te procenu efikasnosti i efektivnosti poslovanja. Interna revizija je zakonski obavezna samo za određene organizacije. Neke od tih organizacija su primarno organizacije javnog sektora i finansijske organizacije, kao i organizacije od javnog interensa. I uz izuzetak manjka zakonske obaveze, veliki značaj se stavlja na preporuke uspostavljanja interne revizije u ostalim vrstama organizacija radi unapređenja i održavanja poslovanja, lakšeg ostvarivanja ciljeva i smanjenja rizika. Za adekvatan rad interne revizije, neophodno je osigurati visok nivo kvaliteta ove funkcije koji zavisi o više faktora. Iako se brojna istraživanja na svetskom nivou bave definisanjem i merenjem kvaliteta interne revizije; uključujući i faktore koji utiču na to, još uvek ne postoji unificiran model ocenjivanja kvaliteta interne revizije, te precizno definisani faktori koji utiču na kvalitet. Cilj ovog rada je da pruži pregled dosadašnjih istraživanja o internoj reviziji te doprinose literaturi na način da pruža uvid u identifikovane faktore koji utiču na kvalitet interne revizije. Ovakva studija je primarno od interesa upravnim i regulatornim telima organizacija koje su u zakonskoj obavezi uspostaviti internu reviziju i pratiti kvalitet rada ove funkcije; te uz to i organizacijama koje prate preporuke za uspostavljanje i održavanje ove funkcije u svojim organizacijama.

DETERMINISANJE KVALITETA INTERNE REVIZIJE

Kvalitet interne revizije odnosi se na sposobnost i efikasnost interne revizije da ispuni svoje ciljeve u organizaciji (1). Neki od glavnih ciljeva interne revizije su: da pruži korisne informacije menadžmentu, obezbedi pridržavanje propisa i standarda, te praćenje i kontrola finansijskih izveštaja, upravljanju rizicima uz preporuke poboljšanja i sudelovanje u kontroli raznih organizacionih procesa (5). Za ostvarenje kvalitetnog rada interne revizije, primarni korak je pridržavanje profesionalnih standarda te propisane zakonske regulative (13). Uz to, kvalitet interne revizije uspostavlja se osiguranjem i praćenjem niza ostalih različitih faktora koji doprinose efektivnosti i efikasnosti funkcije interne revizije u organizaciji. Iako faktori koji utiču na kvalitet interne revizije još uvek nisu definisani i zvanično usvojeni, veliki broj istraživača pristupio je ovoj temi i ustanovio iste ili slične faktore kao ključne od uticaja. Visok kvalitet interne revizije je od suštinske važnosti za organizacije, jer neposredno utiče na kredibilitet i pouzdanost samog rada, nalaza i preporuka interne revizije, te povećava poverenje zainteresovanih strana i doprinosi uspehu i održivosti organizacije.

Postoji više strana koje su zainteresovane za kvalitet interne revizije. Među prvima su rukovodeća tela i donosioci odluka unutar organizacije. Oni se oslanjaju na praćenje njihovog rada od strane interne revizije, te pružanju nezavisne sigurnosti o efikasnosti upravljanja procesima te savetima za izmene i poboljšanje istih. Potom, zainteresovana strana za kvalitet interne revizije je eksterna revizija i eksterni revizori koji se mogu osloniti na rad internih revizora radi adekvatnijeg izvršenja svoje revizorske procedure. Oni kao i regulatori od strane države su zainteresovani da osiguraju pridržavanje relevantnih zakona i propisa od strane organizacije. Potom, zainteresovani za kvalitet interne revizije su investitori i akcionari. Razlog njihove zainteresovanost je sigurnost da su njihova ulaganja zaštićena kroz efektivno upravljanje rizikom i procese kontrole (4).

Za osiguranje kvaliteta funkcije interne revizije prvenstveno odgovoran izvršni direktor/šef interne revizije organizacije (10). Ovakva pozicija uključuje uspostavljanje i održavanje programa osiguranja i poboljšanja kvaliteta koji pokriva sve aspekte aktivnosti interne revizije. Potom, komitet za internu reviziju koji nadgleda funkciju interne revizije i osiguravaju da ona funkcioniše efikasno i nezavisno. Te za kraj, osoblje interne revizije, gde svaki član tima interne revizije odgovoran je za pridržavanje profesionalnih standarda i doprinos ukupnom kvalitetu funkcije revizije.

Shodno prethodno navedenom, kvalitet interne revizije je bez sumnje ključni aspekt koji doprinosi sveukupnom uspehu organizacije i njenoj sposobnosti da se suoči sa izazovima u dinamičnom poslovnom okruženju.

KLASIFIKACIJA MODELA OCENE KVALITETA INTERNE REVIZIJE

U literaturi još uvek ne postoji jedinstveni model za ocenu kvaliteta interne revizije, a za to postoji više razloga. Pre svega, različite vrste organizacija, kao i varijacije u samim pristupima revizijskih procesa, doprinose raznolikosti postojećim u modelima. Na osnovu pregleda dostupne literature, moguće je izdvojiti dve glavne grupe radova:

1. Radovi koji ispituju indikatore koji utiču na kvalitet interne revizije: Ovi radovi fokusiraju se na identifikaciju i analizu različitih faktora i indikatora, kao što su kompetencija revizora, nezavisnost, integritet i profesionalno ponašanje, koji mogu uticati na kvalitet revizorskih rezultata.
2. Radovi koji ispituju kako kvalitet interne revizije utiče ili doprinosi poslovanju preduzeća: Ovi radovi istražuju kako kvalitativni aspekti interne revizije doprinose ukupnom poslovanju organizacije, poboljšanju operativne efikasnosti, odgovornosti i strategijskom upravljanju.

Ovakvi radovi tačnije ustanovljeni modeli za ocenu kvaliteta interne revizije mogu se klasifikovati na nekoliko ključnih korišćenih metodologija:

- **Modeli bazirani na metodi strukturalnih jednačina (SEM metodologiji)**: Ovi modeli su najbrojniji u literaturi. Koriste strukturne jednačine za analizu

kompleksnih odnosa između varijabli i omogućavaju istovremeno testiranje više hipoteza.
- **Modeli zasnovani na faktorskoj analizi**: Ova metoda se koristi za identifikaciju latentnih struktura unutar skupa podataka i može pomoći u razumevanju glavnih indikatora kvaliteta.
- **Modeli zasnovani na regresionoj analizi**: Ove metode fokusiraju se na ispitivanje uzročno-posledičnih veza između specifičnih faktora i kvaliteta interne revizije.
- **Modeli zasnovani na analitičkim hijerarhijskim procesma** koji kombinuju kvantitativne i kvalitativne kriterijume.

Pored navedenih metodologija koje se koriste za kreiranje modela za ocenu kvaliteta interne revizije, u literaturi se mogu naći i brojni radovi koji se baziraju na sistemskom pregledu literature. Ovakvi radovi omogućavaju na jednom mestu sveobuhvatan pregled sprovedenih istraživanja na temu kvaliteta interne revizije, u cilju sistematizacije korišćene metodologije i identifikovanja ključnih faktora kvaliteta interne revizije.

PREGLED MODELA OCENE KVALITETA INTERNE REVIZIJE

Autori **Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022)** rada „Izgradnja indeksa evaluacije kvaliteta interne revizije: dokazi kompanija koje kotiraju na berzi u provinciji Jiangsu, Kina" su se fokusirali na kreiranje Indeksa evaluacije kvaliteta interne revizije. Za potrebe istraživanja koristili su uzorak od 27 kompanija koje se nalaze na berzi u provinciji Jiangsu, Kina. Uzorak je uključivao zainteresovane strane relevantne za istraživanje kvaliteta interne revizije, kao što su: interni revizori, upravljačko osoblje i članovi odbora za reviziju. Uključena je i raznovrsna grupa stručnjaka, uključujući domaće i strane naučnike specijalizovane za korporativno upravljanje i internu reviziju.

U svom istraživanju, autori rada su koristili kombinaciju metodologija za izradu Indeksa evaluacije kvaliteta interne revizije uz značaj primene metoda procesa analitčke hijerarhije. Među ostalim korišćenim metodologijama su: Sistematski pregled literature, potom Balanced Scorecard (BSC) pristup, Delphi metoda, metode evaluacije modela.

Autori ovog istraživanja konstruisali su višeslojni indeks za evaluaciju kvaliteta interne revizije koji se sastoji od pet dimenzija a indikatori su varijable koje se koriste za procenu različitih dimenzija vezanih za kvalitet interne revizije. Pet ključnih ustanovljenih dimenzija su (5):

1. Zadovoljstvo zainteresovanih strana: sadrži 8 indikatora
2. Doprinos zainteresovanih strana: sadrži 9 indikatora
3. Finansijski rezultati: sadrži 7 indikatora
4. Proces interne revizije: sadrži 6 indikatora
5. Učenje i rast: sadrži 6 indikatora

Shodno tome, studija je identifikovala ukupno 36 indikatora za indeks evaluacije kvaliteta interne revizije. Rezultati istraživanja su pokazali da je dimenzija procesa interne revizije je najkritičnija a stepen prihvatanja zaključaka interne revizije od strane menadžmenta je naglašen kao ključni među pokazateljima zadovoljstva zainteresovanih strana. Usvajanje i implementacija revizorskih preporuka smatra se najprioritetnijim indikatorom finansijskih rezultata. Uz prethodno navedeno, rezultati su odrazili široku saglasnost među zainteresovanim stranama o važnosti dimenzija i indikatora za efektivnu procenu i poboljšanje kvaliteta interne revizije.

U radu „Odrednice efikasnosti interne revizije u javnom preduzeću Etiopije, slučaj južnog regiona" autori **Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019)** su se fokusirali na interne revizije ukupno 47 organizacija iz javnog sektora u regionu Etiopije. Ukupan broj internih revizora u ovim javnim sektorima se sastoji od različitih nivoa organizacija klasifikovanih kao osnovne organizacije za obradu i organizacije nivoa. Shodno tome, studija je koristila veličinu uzorka od 118 internih revizora.

Za istraživanje je korišten pristup mešovitih metoda (kvalitativni i kvantitativni), koji integriše deskriptivne i ekonometrijske metode. Primarni podaci su prikupljeni putem upitnika distribuiranog osoblju interne revizije i intervjua obavljenih sa generalnim menadžerima/šefovima organizacija. Sekundarni podaci su prikupljeni iz izveštaja i postojeće literature o učinkovitosti interne revizije. Upitnik je razvijen tako da kvantifikuje percepcije u vezi sa efektivnošću interne revizije i njenim determinantama a pitanja se fokusiraju na različite faktore tačnije indikatore koji uključujući (7):

- Kompetentnost osoblja
- Nezavisnost odjeljenja interne revizije
- Dostupnost resursa
- Podrška menadžmentu
- Odnosi između internih i eksternih revizora
- Postojanje odobrene povelje interne revizije

Dok su kvalitativni podaci prikupljeni kroz intervjue sa ključnim osobljem kako bi se pružio uvid u funkcionisanje i izazove sistema interne revizije. Studija je koristila model uređene logističke regresije za analizu podataka, gde je procenjeno kako različite nezavisne varijable utiču na delotvornost interne revizije. Rezultati ukazuju na to da je jačanje kapaciteta i broja internih revizora ključni aspekt razvojnih strategija, ali kvalitet i kvantitet revizora i dalje predstavljaju značajnu zabrinutost. Uz navedeno, autori naglašavaju sledeće zaključke: da žene revizori značajno povećavaju efektivnost interne revizije, da prisustvo kompetentnih zaposlenih pozitivno predviđa efektivnost interne revizije, da sposobnost internih revizora za nezavisan rad u velikoj meri utiče na njihovu efektivnost, da dostupnost i ljudskih i materijalnih resursa predviđa efektivnost interne revizije, da uglađen odnos između internih i eksternih revizora značajno utiče na efektivnost, te da postojanje standardizovane i odobrene povelje interne revizije pozitivno utiče na efektivnost interne revizije.

Autori rada „Odrednica kvaliteta rezultata interne revizije sa radnim iskustvom kao moderacijom", **Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021)**, imali su za cilj analizirati i testirati različite faktore koji utiču na kvalitet rezultata interne revizije. Istraživanje je obuhvatilo ukupno 74 ispitanika iz javnog sektora. Važno je naglasiti da su autori u svom radu merili nekoliko indikatora vezanih za svaku varijablu (11):

- Kompetencija: Znanje i stručnost u reviziji, samorazvoj, razumevanje tehnika revizije.
- Nezavisnost: Sposobnost rada bez predrasuda, pridržavanja ponašanja i čuvanja činjenica nepromenjenih vanjskim uticajima.
- Integritet: Posvećenost etičkim standardima, poštenje i pouzdanost u izveštavanju o nalazima.
- Kvalitet rezultata revizije: Tačnost nalaza, preporuke koje se mogu preduzeti na osnovu revizija.
- Radno iskustvo: dužina službe, učešće u revizijama i broj nalaza revizije.

U analizi podataka korišten je model strukturne jednačine (SEM), s testiranjem hipoteza kroz multivarijantnu analizu pomoću programa SmartPLS. Glavni nalazi istraživanja do kojih su autori došli ukazuju na sledeće: Kompetentnost ima negativan i beznačajan uticaj na kvalitet rezultata revizije; Nezavisnost takođe pokazuje negativan i beznačajan uticaj na rezultate revizije; Integritet, naprotiv, ima pozitivan i značajan uticaj na kvalitet rezultata revizije. Umereni efekti radnog iskustva na kompetentnost i nezavisnost u odnosu na rezultate revizije su negativni i beznačajni, dok Uticaj integriteta na kvalitet revizije sa radnim iskustvom kao moderirajućom varijablom je također pozitivan, ali beznačajan. Ovakvi rezultati ukazuju na neophodnost jačanja integriteta revizora i sugerišu da bi u budućim istraživanjima trebalo dalje istražiti i dodatne varijable koje mogu uticati na kvalitet revizije, kao što su odgovornost i profesionalna opreznost.

U radu „Uticajni faktori delotvornosti interne revizije: konceptualni model", autori **Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022)** sproveli su istraživanje pomoću sistematskog pregleda literature. Ova metodologija omogućila je precizno prikupljanje relevantnih podataka i analizu postojećih studija kako bi se došlo do ključnih informacija o efikasnosti interne revizije. Do uzorka ovog kompleksnog istraživanja se došlo analize više od 5.000 radova, od kojih je, nakon detaljnog pregleda i procene kvaliteta, odabrano 34 naučna rada. Za odabir uzorka obuhvaćen je i dug vremenski period, tačnije od 1999. do 2022. godine, čime je osigurano uključivanje što šireg spektra istraživanja i oslanjanje na pouzdane i aktuelne izvore. Cilj ovog istraživanja bio je identificirati ključne faktore koji utiču na učinkovitost interne revizije i integrirati ih u konceptualni model. Ključni faktori koji su identificirani u istraživanju uključuju (1):

- Organizacijske karakteristike, koje obuhvataju veličinu interne revizije i njenu nezavisnost. Ovi elementi ključni su za osiguranje profesionalnog standarda i neovisnog nastupa interne revizije unutar organizacijske strukture.

- Odnosi, koji uključuju kvalitetnu saradnju s odborom za reviziju i neophodnu podršku višeg menadžmenta. Ovi odnosi značajno utiču na efikasnost interne revizije, posebno u pogledu resursa, podrške i usvajanja preporuka.
- Procesi interne revizije, s naglaskom na implementaciji pristupa temeljenog na riziku, koji omogućava fokusiranje na ključna područja rizika unutar organizacije, te programa osiguranja kvalitete, kojim se standardizira i unapređuje kvalitet revizijskih procesa.
- Resursi, koji se odnose na kompetencije internog revizorskog osoblja, njihovo znanje, veštine i kontinuiranu obuku, ali također i na outsourcing, koji organizacijama omogućava pristup specijalizovanim stručnjacima kad god je to potrebno.
- Koordinacija, koja se ogleda kroz implementaciju modela kombiniranog osiguranja i uskog rada interne revizije s eksternim revizorima, čime se osigurava veća efikasnost i izbegava preklapanje revizorskih aktivnosti.

Cilj istraživanja rada „Odrednica kvaliteta revizije na osnovu modela sposobnosti interne revizije", autora **S. Hastuti, R. P. Sari, O. Tannar (2018)**, je unaprediti stručnost revizora kroz analizu uticaja kompetencije**,** nezavisnosti**,** pritiska poslušnosti i sistema interne kontrole na kvalitet rezultata revizije, koristeći model strukturalnih jednačina. Drugim rečima, istraživanje nastoji ustanoviti faktore koji utiču na kvalitet revizije kako bi se pružile praktične smernice za poboljšanje revizorskih praksi, povećanje transparentnosti i profesionalnosti u okviru interne revizije u javnom sektoru. Autori su za potrebe ovog istraživanja prikupili podatke putem anketnih upitnika, što omogućava direktno ispitivanje percepcija i iskustava revizora u odnosu na navedene varijable istraživanja. Uzorak je obuhvatao ukupno 53 interna revizija u javnom sektoru u Indoneziji.

Sprovedenim istraživanjem, autori su ustanovili sledeće ključne indikatore koji utiču na kvalitet rezultata revizije (3):

- Kompetencija: Reflektuje znanje, stručnost i iskustvo revizora. Kompetentni revizori osiguravaju kvalitetniji revizorski proces kroz primenu profesionalnih standarda i prenose vredne povratne informacije odgovornim organima organizacije.
- Nezavisnost: Sposobnost revizora da deluju profesionalno i objektivno, bez vanjskog uticaja.
- Pritisak poslušnosti: Pritisak koji nadređeni ili drugi autoriteti vrše na revizore kako bi donosili odluke u korist određenih interesa. Ova vrsta pritiska smanjuje objektivnost revizije i može izazvati moralne dileme i konflikte interesa.
- Sistem interne kontrole: Uključuje procese revizija, nadzor, evaluacije i praćenje koji osiguravaju pravovremeno otkrivanje nepravilnosti, zloupotreba ovlasti i curenja resursa. Efikasna interna kontrola pomaže organizacijama da bolje prate ciljeve i smanjuju rizike.
- Kvalitet rezultata revizije: Meren kroz tačnost, objektivnost, pravovremenost i celovitost revizorskih izveštaja. Kvalitetni rezultati revizije ojačavaju poverenje javnosti i unapređuju transparentnost u upravljanju.

Rezultati istraživanja, analizom odnosa indikatora i kvaliteta revizije ustanovili su da: Kompetencija revizora ima pozitivan i značajan uticaj na kvalitet rezultata revizije. Nezavisnost nije značajno uticala na kvalitet revizije. Pritisak poslušnosti također nije imao značajan uticaj na kvalitet revizije. Međutim, primjećeno je da pritisak od nadređenih često stvara konflikt interesa i moralne dileme kod revizora, što može indirektno smanjiti objektivnost izveštaja. Te da je efikasan sistem interne kontrole značajno utiče na kvalitet revizije jer omogućava rano prepoznavanje nepravilnosti i osigurava da organizacijski ciljevi budu postignuti. Time se može zaključiti da istraživanje ističe važnost ključnih faktora, posebno kompetencije revizora i sistema interne kontrole, u osiguravanju visokokvalitetne revizije. No, problemi kao što su nedovoljna nezavisnost, pritisak poslušnosti i ograničeni resursi i dalje su prepreke za postizanje bolje revizorske prakse. Uvođenje dodatnih obuka i jačanje sistema kontrole preporučuje se za unapređenje revizijskih procesa u javnom sektoru. Istraživanje ima i praktične implikacije za vlade koje trebaju dodatno raditi na jačanju kompetencija i kapaciteta svojih revizora.

U radu autora **Aida Krichene i Emna Baklouti (2020)**, „Kvalitet interne revizije: percepcije i objašnjenja internih revizora iz Tunisa", cilj je razumeti kako interni revizori u Tunisu percipiraju kvalitet interne revizije i identificirati različite profile revizora na osnovu njihove percepcije determinanti kvaliteta interne revizije. Istraživanje teži ka kreiranju modela za merenje kvaliteta interne revizije prema percepcijama revizora koristeći specifične faktore koji utiču na kvalitet interne revizije. Uzorak ovog istraživanja se sastoji od 104 internih revizora zaposlenih u Tunisu. Pri odabiru uzorka, korišten je upitnik s 22 stavke podeljen u pet dimenzija, a istraživanjem su obuhvaćeni revizori iz privatnog i javnog sektora.. Za obradu podataka istraživanja koristila se metoda faktorske analize radi izdvajanja glavnih faktora i proveru validnosti modela.

Na temelju rada, identificirano je sedam determinanti kvaliteta interne revizije (6):

- Znanje internog revizora (obrazovanje, certifikati, iskustvo, korišćenje moderne tehnologije).
- Polje delovanja internog revizora (mogućnost revidiranja svih delova organizacije).
- Nezavisnost izveštavanja (bez vanjskog uticaja na nalaze revizije).
- Uvažavanje profesionalnih standarda (usklađenost sa standardima interne revizije).
- Saradnja s eksternim revizorom (redovni sastanci i koordinacija).
- Pristup informacijama (slobodan pristup potrebnim podacima).
- Lični odnosi internog revizora (odnos sa upravljačkim timom i odborom za reviziju).

Rezultati istraživanja ukazuju na to da su najvažniji faktori kvaliteta interne revizije: Polje delovanja revizora i pristup informacijama najviše objašnjavaju kvalitet revizije. Manje značajni faktori: Znanje internog revizora i saradnja s vanjskim revizorom nisu imali značajan učinak na kvalitet revizije. Kao zaključak, ovi faktori doprinose kvalitetnijem upravljanju i boljem funkcionisanju revizijskih aktivnosti u tuniskim organizacijama.

„Faktori koji utiču na efikasnost interne revizije preduzeća u Vijetnamu" rad je autora **The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)**. Istraživanje je nastojalo razumeti kako karakteristike interne revizije, poput veličine, kapaciteta revizora, dometa, metoda, nezavisnosti i operativne osnove, doprinose povećanju efikasnosti interne revizije. Uzorak istraživanja uključuje 114 anketa prikupljenih od 38 preduzeća u Vijetnamu tokom perioda 2018-2019. uzorak obuhvata 38 internih revizora, 28 predstavnika izvršnih odbora i 38 predstavnika odbora direktora. Podaci su obrađeni primenom faktorske analize. Sprovođenjem analize, autori istraživanja ustanovili su faktore interne revizije koji utiču na njenu efikasnost (2):

- Veličina interne revizije: Broj revizora u organizaciji.
- Kapacitet internih revizora: Zasnovano na znanju, iskustvu i veštinama revizora.
- Opseg interne revizije: Uključuje obuhvat sadržaja, objekata i ciklusa revizije.
- Metode interne revizije: Koristi se pristup zasnovan na riziku, naprednoj tehnologiji i kontinuiranoj reviziji.
- Nezavisnost interne revizije: Uključuje pristup informacijama, ovlašćenja i izveštavanje na najvišem nivou upravljanja.
- Operativna osnova interne revizije: Pravilnici, godišnji planovi i programi za osiguranje kvaliteta revizije.
- Efikasnost interne revizije: Procenjuje učinkovitost u povećanju kvaliteta upravljanja, usklađenosti, smanjenju rizika za gubitke i poboljšanju korporativnog upravljanja.

Autori ovog istraživanja, analizom prikupljenih podataka ustanovili su koji su to glavni faktori koji utiču na efikasnost. Faktor sa najvećim uticajem je Operativna osnova i metode interne revizije, dok Kapacitet revizora, opseg revizije, veličina revizije i nezavisnost također pozitivno utiču na efikasnost revizije, ali manjim intenzitetom. S tim u vezi, svi istraživani faktori imaju pozitivan uticaj na efikasnost interne revizije. Na osnovu rezultata istraživanja autori rada su definisali i predloge za unapređenje koji uključuju: Jačanje operativne osnove revizije, primena modernih metoda revizije, povećanje nezavisnosti revizije, proširenje opsega revizije, te povećanje veličine i kapaciteta revizorskog osoblja. Rezultati naglašavaju važnost efikasne interne revizije u poboljšanju upravljanja, smanjenju rizika i povećanju ukupne učinkovitosti poslovanja preduzeća čelika u Vijetnamu.

Cilj istraživanja „Prethodnici i implikacije kvaliteta interne revizije na efikasnost interne revizije", autora **Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)**, je bolje razumevanje faktora koji doprinose efikasnosti interne revizije i istraživanje odnosa između interne revizije i kvaliteta interne revizije, što ima direktne implikacije na korporativno upravljanje u organizacijama. Drugim rečima, postizanjem cilja istraživanja, autori žele ukazati na konkretne faktore koji mogu pomoći menadžerima i rukovodiocima interne revizije u efektivnom dizajnu i sprovođenju unutrašnjih kontrola te postizanju boljih rezultata revizije koji podržavaju kontinuirano unapređenje korporativnih praksi i performansi.

Za sprovođenje istraživanja, autori su koristili uzorak od 102 popunjena upitnika od strane internih revizora i rukovodilaca interne revizije iz 12 multinacionalnih kompanija u Maleziji. Indikatori koje su autori ustanovili ovim istraživanjem se dele na indikatore povezane sa efikasnošću interne revizije i indikatore povezane sa kvalitetom interne revizije. Tri glavna indikatora koji utiču na efikasnost interne revizije su (8):

- Podrška menadžmenta: Odnosi se na nivo podrške koju menadžment pruža internim revizorima u obavljanju njihovih zadataka. Ključne oblasti obuhvataju: Obezbeđivanje resursa potrebnih za reviziju, uključujući adekvatno i obučeno osoblje. Uključivanje menadžmenta u planiranje revizije. Pravovremena reakcija na nalaze i preporuke revizije.
- Podrška i prihvatanje od strane revidiranih odeljenja: Ovo uključuje stepen saradnje i kooperacije revidiranih odeljenja sa unutrašnjim revizorima. Indikacije uključuju: Lak pristup dokumentaciji, informacijama, i procesima važnim za reviziju. Spremnost revidiranih odeljenja da prihvate rezultate revizije i preporuke.
- Koordinacija između odeljenja: Uključuje nivo koordinacije između interne revizije i drugih funkcija u organizaciji. Indikacije koordinacije uključuju: Saradnju i sinhronizaciju zadataka između odeljenja radi efikasnog sprovođenja revizije. Razmenu relevantnih informacija i izveštaja kako bi se izbegla preklapanja u radu. Jasnoća u podeli odgovornosti za zadatke interne revizije.

Potom, kvalitet interne revizije povezan je sa tri temeljna principa, koja su takođe indikatori efikasnosti. Ovo su kako autori navode „stubovi" interne revizije (8):

- Nezavisnost: Osnovni kriterijum za efikasno obavljanje revizije. Odnosi se na slobodu revizora da deluju bez pritisaka, interferencija ili sukoba interesa. Ključne karakteristike: Interni revizori imaju potpunu autonomiju u pristupu informacijama i pitanjima koja smatraju relevantnim. Revizori nisu pod direktnim uticajem menadžmenta ili revidiranih odeljenja.
- Objektivnost: Podrazumeva nepristrasnost u obavljanju revizorskih zadataka i donošenju zaključaka. Ključne karakteristike: Interni revizori izbegavaju svakakav sukob interesa (npr. revizija timova gde rade prijatelji ili rođaci). Revizorski nalazi su utemeljeni na dokazima, a ne na ličnim stavovima.
- Kompetencija: Odnosi se na sposobnost i nivo profesionalnog znanja internog revizora. Ključne karakteristike: Revizori imaju relevantne akademske kvalifikacije. Poseduju profesionalne sertifikate (poput Certified Internal Auditor – CIA, ovlašteni interni revizor). Kontinuirano unapređuju svoja znanja i veštine kroz profesionalni razvoj. Imaju praktično iskustvo u oblasti interne revizije.

Podaci su analizirani koristeći strukturno modeliranje jednačina (SEM) pomoću softvera SmartPLS 3.0. Analiza je uključivala validaciju modela kroz pouzdanost, konvergentnu i diskriminantnu validnost. Rezultati ovog istraživanja ukazali su da podrška menadžmenta, koordinacija između odeljenja i podrška/kooperacija revidiranih odeljenja

značajno utiču na efikasnost interne revizije. Te da nezavisnost, objektivnost, i kompetencija interne revizije pozitivno utiču na kvalitet interne revizije. Uz to, a na osnovu rezultata istraživanja, autori ukazuju na važnu ulogu menadžmenta. Njegova podrška ključna je za efikasnost interne revizije kroz resurse, trening i saradnju. Glavni zaključak istraživanja je da efikasno sprovedena interna revizija, koja je nezavisna, objektivna i kompetentna, dovodi do kvalitetnijih revizija i poboljšava organizacione procese i usklađenost sa korporativnim upravljanjem.

Na osnovu prethodno iznetog pregleda literature u vezi faktora kvaliteta interne revizije, kreirana je Tabela 1 koja pokazuje osnovne specifičnosti prezentovanih radova sa aspekta korišćenog uzorka i metodologije istraživanja, indikatora kvaliteta i ključnih rezultata po pitanju faktora koji utiču na kvalitet interne revizije.

Na osnovu pregleda dosadašnjih istraživanja može se zaključiti da ne postoji jedinstvena metodologija po pitanju istraživanja koji faktori utiču na kvalitet interne revizije. I pored toga određeni faktori kvaliteta interne revizije ističu se kao najznačajniji i kao najčešće korišćeni u modelima ocene kvaliteta interne revizije. Shodno navedenom, u nastavku je kreirana Tabela 2 koja ukazuje koji su ključni faktori kvaliteta interne revizije koji su identifikovani u postojećim istraživanjima.

Tabela 1. Prikaz modela ocene kvaliteta interne revizije

Naslov rada, autori i godina objave rada)	Izgradnja indeksa evaluacije kvaliteta interne revizije: dokazi kompanija koje kotiraju na berzi u provinciji Jiangsu, Kina (Originalni naslov: Constructing internal audit quality evaluation index: evidence from listed companies in Jiangsu province, China) Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022)
Uzorak i metodologija	Uzorak: 27 kompanija koje se nalaze na berzi u provinciji Jiangsu, Kina. Metodologija: Proces analitičke hijerarhije (AHP)
Indikatori	36 indikatora razvrstanih u pet dimenzija: • Zadovoljstvo zainteresovanih strana: 8 indikatora • Doprinos zainteresovanih strana: 9 indikatora • Finansijski rezultati: 7 indikatora • Proces interne revizije: 6 indikatora • Učenje i rast: 6 indikatora
Rezultati	• Dimenzija procesa interne revizije je najkritičnija • Stepen prihvatanja zaključaka interne revizije od strane menadžmenta je ključni među pokazateljima zadovoljstva zainteresovanih strana • Saglasnost zainteresovanih stranama o važnosti dimenzija i indikatora za efektivnu procenu i poboljšanje kvaliteta interne revizije • Kombinovani metodološki pristup istraživanja osigurao je sveobuhvatan, pouzdan i validan indeks evaluacije kvaliteta interne revizije

Naslov rada, autori i godina objave rada)	Odrednice efikasnosti interne revizije (IAE) u javnom preduzeću Etiopije, slučaj južnog regiona (Originalni naslov: Determinants of Internal Audit Effectiveness (IAE) in the Ethiopian Public Enterprise, Case of Southern Region) Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019)
Uzorak i metodologija	Uzorak: 118 internih revizora iz javnog sektora Metodologija: Regresiona analiza
Indikatori	• Kompetentnost osoblja • Nezavisnost odelenja interne revizije • Dostupnost resursa • Podrška menadžmenta • Odnosi između internih i eksternih revizora • Postojanje odobrene povelje interne revizije
Rezultati	• Važnost efektivnosti interne revizije za bolje upravljanje i upravljanje resursima u kancelarijama javnog sektora. • Jačanje mehanizama podrške internim revizorima, fokusirajući se na razvoj kompetencija, osiguravanje nezavisnosti i podsticanje saradnje između internih i eksternih revizora. • Prisustvo revizorske povelje kao kritične determinante efektivnosti interne revizije u javnom sektoru.

Naslov rada, autori i godina objave rada)	Odrednica kvaliteta rezultata interne revizije sa radnim iskustvom kao moderacijom (Originalni naslov: Determinant of Quality of Internal Audit Results with Work Experience As A Moderation) Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021)
Uzorak i metodologija	Uzorak: 74 ispitanika iz javnog sektora Metodologija: Model strukturne jednačine (SEM), uz upotreb SmartPLS softvera.
Indikatori	• Kompetencija: Znanje i stručnost u reviziji, samorazvoj, razumevanje tehnika revizije. • Nezavisnost: Sposobnost rada bez predrasuda, pridržavanja ponašanja i čuvanja činjenica nepromenjenih vanjskim uticajima. • Integritet: Posvećenost etičkim standardima, poštenje i pouzdanost u izveštavanju o nalazima. • Kvalitet rezultata revizije: Tačnost nalaza, preporuke koje se mogu preduzeti na osnovu revizija. • Radno iskustvo: dužina službe, učešće u revizijama i broj nalaza revizije.
Rezultati	• Kompetentnost ima negativan i beznačajan uticaj na kvalitet rezultata revizije; Nezavisnost ima negativan i beznačajan uticaj na rezultate revizije; • Integritet ima pozitivan i značajan uticaj na kvalitet rezultata revizije; Umereni efekti radnog iskustva na kompetentnost i nezavisnost u odnosu na rezultate revizije su negativni i beznačajni; • Uticaj integriteta na kvalitet revizije sa radnim iskustvom kao moderirajućom varijablom je pozitivan, ali beznačajan.

Naslov rada, autori i godina objave rada)	Uticajni faktori delotvornosti interne revizije: konceptualni model (Originalni naslov: The Influential Factors of Internal Audit Effectiveness: A Conceptual Model) Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022)
Uzorak i metodologija	Uzorak: 34 naučna rada Metodologija: sistemski pregled literature
Indikatori	Pet ključnih faktora interne revizije i njihove dimenzije: • Organizacijske karakteristike interne revizije (nezavisnost i veličina interne revizije) • Odnosi interne revizije (odnos s revizijskim odborom i podrška višeg menadžmenta) • Procesi interne revizije (primena revizije temeljene na riziku i program osiguranja i poboljšanja kvalitete) • Resursi interne revizije (kompetencije internih revizora i outsourcing interne revizije) • Koordinacija s drugim davateljima usluga osiguranja (vođenje implementacije kombiniranog osiguranja i koordinacija s vanjskim revizorom)
Rezultati	Autor naglašava važnost svakog faktora za učinkovitost interne revizije te pruža temelj za buduća istraživanja i testiranje modela.

Naslov rada, autori i godina objave rada)	Odrednica kvaliteta revizije na osnovu modela sposobnosti interne revizije (Originalni naslov: The determinant of Audit Quality Based on Internal Audit Capability Model (IACM)) S. Hastuti, R. P. Sari, O. Tannar (2018)
Uzorak i metodologija	Uzorak: se sastoji od 53 interna revizija u javnom sektoru u Indoneziji Metodologija: Metod strukturalnih jednačina
Indikatori	Faktori kvaliteta interne revizije su grupisani u 5 grupa: • Kompetencija • Nezavisnost • Pritisak poslušnosti • Sistem interne kontrole • Kvalitet rezultata revizije
Rezultati	• Kompetencija revizora ima pozitivan i značajan uticaj na kvalitet rezultata revizije. • Nezavisnost nije značajno uticala na kvalitet revizije. • Pritisak poslušnosti također nije imao značajan uticaj na kvalitet revizije. • Efikasan sistem interne kontrole značajno utiče na kvalitet revizije jer omogućava rano prepoznavanje nepravilnosti i osigurava da organizacijski ciljevi budu postignuti.

Naslov rada, autori i godina objave rada)	Kvalitet interne revizije: percepcije i objašnjenja internih revizora u Tunisu (Originalni naslov: Internal audit quality: perceptions of Tunisian internal auditors an explanatory research) Aida Krichene i Emna Baklouti (2020)
Uzorak i metodologija	Uzorak: 104 revizora iz privatnog i javnog sektora u Tunisu. Metodologija: metoda faktorske analize
Indikatori	Faktori kvaliteta interne revizije: • Znanje internog revizora • Polje delovanja internog revizora • Nezavisnost izveštavanja • Uvažavanje profesionalnih standarda • Saradnja s eksternim revizorom • Pristup informacijama • Lični odnosi internog revizora
Rezultati	• Polje delovanja revizora i pristup informacijama najviše objašnjavaju kvalitet revizije. • Manje značajni faktori: Znanje internog revizora i saradnja s vanjskim revizorom nisu imali značajan učinak na kvalitet revizije.

Naslov rada, autori i godina objave rada)	Faktori koji utiču na efikasnost interne revizije preduzeća čelika u Vijetnamu (Originalni naslov: Factors Affecting the Internal Audit Effectiveness of Steel Enterprises in Vietnam) The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Uzorak i metodologija	Uzorak: 114 anketa prikupljenih od 38 preduzeća u Vijetnamu tokom perioda 2018-2019. Metodologija: metoda faktorske analize
Indikatori	Faktori interne revizije: • Znanje internog revizora • Polje delovanja internog revizora • Nezavisnost izveštavanja • Uvažavanje profesionalnih standarda • Saradnja s eksternim revizorom • Pristup informacijama • Lični odnosi internog revizora
Rezultati	Faktor sa najvećim uticajem je Operativna osnova i metode interne revizije, dok Kapacitet revizora, opseg revizije, veličina revizije i nezavisnost također pozitivno utiču na efikasnost revizije, ali manjim intenzitetom.

Naslov rada, autori i godina objave rada)	Prethodnici i implikacije kvaliteta interne revizije na efikasnost interne revizije (Originalni naslov: Antecedents and Internal Audit Quality Implications of Internal Audit Effectiveness) Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Uzorak i metodologija	Uzorak: 102 popunjena upitnika od strane revizora i rukovodioca interne revizije iz 12 kompanija u Maleziji. Metodologija: strukturno modeliranje jednačina (SEM) pomoću softvera SmartPLS 3.0.
Indikatori	Indikatori efikasnosti interne revizije: • Podrška menadžmenta • Podrška i prihvatanje od strane revidiranih odelenja • Koordinacija između odelenja Indikatori kvaliteta interne revizije: • Nezavisnost • Objektivnost • Kompetencija
Rezultati	• Podrška menadžmenta, koordinacija između odeljenja i podrška/ kooperacija revidiranih odeljenja značajno utiču na efikasnost interne revizije. • Nezavisnost, objektivnost, i kompetencija interne revizije pozitivno utiču na kvalitet interne revizije

Tabela 2. Ključni faktori kvaliteta interne revizije identifikovani u radovima, rangirani po broju radova

Indikator	Broj radova	Autori (i godina)
Kompetentnost	7	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Nezavisnost	7	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)

Pristup informacijama	4	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Uvažavanje profesionalnih standarda	4	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Saradnja sa eksternom revizijom	4	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Procesi interne revizije	3	• Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018)
Podrška menadžmenta	3	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Objektivnost	2	• Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Zadovoljstvo	2	• Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018)

ZAKLJUČAK

Interna revizija igra ključnu ulogu u unapređenju poslovanja organizacije, pružajući nezavisno i objektivno uveravanje, uz doprinos efektivnosti upravljanja, kontrole i procesa upravljanja rizikom. Kvalitet interne revizije značajno utiče na sveukupno poverenje zainteresovanih strana i uspeh organizacije, posebno kroz njen doprinos kredibilitetu, usklađenosti sa zakonima i standardima te efikasnosti organizacionih procesa (2). Kvalitet interne revizije ne samo da osigurava transparentnost i odgovornost unutar organizacije, već doprinosi i njenoj dugoročnoj održivosti u dinamičnom poslovnom okruženju (12).

Kvalitet interne revizije mora kontinuirano da se evaluira kako bi se identifikovali faktori koji doprinose kvalitetu interne revizije, odnosno kako bi se identifikovala kritična područja po pitanju kvaliteta interne revizije. Kao najznačajniji faktori kvaliteta interne revizije ističu se kompetentnost i nezavisnost interne revizije. Ovi faktori postavljaju se kao osnova za kvalitetno uspostavljanje i funkcionisanje interne revizije. Za pitanje kvaliteta interne revizije odgovoran je pre svega rukovodilac službe interne revizije. U interesu rukovodica službe za internu reviziju, ali i u interesu menadžmenta, odbora i celokupnog preduzeća u kojem posluje interna revizija, je da se kvalitet interne revizije kontinuirano unapređuje. Upravo se kroz istraživanje faktora kvaliteta interne revizije mogu identifikovati ključni faktori koji pozitivno ili negativno utiču na kvalitet interne revizije, te shodno tome se mogu preduzeti određeni koraci u cilju unapređenja kvalitat interne revizije.

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Dijana Rađo[1]

ORIGINAL RESEARCH PAPER
UDC 657.6

Received: 03.02.2025.
Accepted: 25.02.2025.
Published: 31.03.2025.

Review of Factors Affecting the Quality of Internal Audit

Abstract: *Internal audit, as an independent and objective function, plays a key role in improving organizational performance by assessing and enhancing the effectiveness of risk management, control, and organizational processes. Although not legally required in all countries, its establishment is becoming increasingly important, particularly in the public sector, financial organizations, and corporations, to enhance operations, achieve objectives, and mitigate risks. The quality of internal audit is defined by its ability to meet organizational goals by providing valuable information to management, ensuring regulatory compliance, managing risks, and improving internal control systems and organizational processes. Its significance is reflected in increasing audit credibility, stakeholder trust, and the long-term sustainability of an organization. Key quality factors include professional standards, management support, independence, objectivity, auditor competence, and effective coordination with external auditors. Although there is no universal model for assessing internal audit quality, research emphasizes the importance of various methodological approaches, including SEM methodology, factor analysis, regression models, and systematic literature reviews, to gain a more precise understanding of quality indicators. This paper presents research focused on examining internal audit quality and identifying key factors that determine it.*

Keywords: *internal audit, internal audit quality, factors affecting internal audit quality*

[1] University of Novi Sad, Faculty of Economics in Subotica.
E-mail: dijana.radjo@hotmail.com

INTRODUCTION

Internal audit is an independent and objective assurance and consulting activity designed to add value and improve an organization's operations. Through its activities, internal audit helps organizations achieve their objectives by adopting a systematic and disciplined approach to assessing and enhancing the effectiveness of risk management, control, and governance processes. In this regard, internal audit examines all business functions, activities, and processes within an organization. This may include ensuring compliance with regulations and internal policies, as well as evaluating operational efficiency and effectiveness. Internal audit is legally required only for certain organizations, primarily in the public sector, financial institutions, and entities of public interest. Despite the absence of a universal legal obligation, there are strong recommendations for establishing internal audit in other types of organizations to improve and maintain operations, facilitate goal achievement, and reduce risks. To ensure the proper functioning of internal audit, a high level of quality must be maintained, which depends on multiple factors. Although extensive global research focuses on defining and measuring internal audit quality, including the factors influencing it, a standardized assessment model and precisely defined influencing factors have not yet been established. The objective of this paper is to review existing research on internal audit and contribute to the literature by providing insight into identified factors that impact internal audit quality. Such a study is of primary interest to regulatory and governance bodies of organizations legally required to establish and monitor internal audit quality, as well as to organizations that follow recommendations for setting up and maintaining this function.

DETERMINING INTERNAL AUDIT QUALITY

Internal audit quality refers to the ability and efficiency of internal audit to fulfill its organizational objectives (1). Some of the main goals of internal audit include providing valuable information to management, ensuring compliance with regulations and standards, monitoring and controlling financial reporting, managing risks with improvement recommendations, and participating in the oversight of various organizational processes (5). Achieving high-quality internal audit work requires adherence to professional standards and legal regulations (13). Additionally, internal audit quality is established by ensuring and monitoring various factors that contribute to the effectiveness and efficiency of the internal audit function. Although the factors influencing internal audit quality have not yet been officially defined and standardized, numerous researchers have explored this topic and identified similar key influencing factors. A high-quality internal audit function is crucial for organizations, as it directly impacts the credibility and reliability of audit work, findings, and recommendations. It also enhances stakeholder trust and contributes to an organization's success and sustainability.

Multiple stakeholders are interested in internal audit quality. Primarily, governance bodies and decision-makers within an organization rely on internal audit to provide independent assurance on the effectiveness of processes and to offer recommendations for improvement. External auditors and regulatory authorities also depend on internal audit work to ensure compliance with relevant laws and regulations. Additionally, investors and shareholders are interested in internal audit quality, as it provides assurance that their investments are protected through effective risk management and control processes (4).

The primary responsibility for ensuring the quality of the internal audit function lies with the Chief Audit Executive (CAE) (10). This role includes establishing and maintaining a quality assurance and improvement program that covers all aspects of internal audit activities. Additionally, the internal audit committee oversees the internal audit function, ensuring that it operates efficiently and independently. Lastly, internal audit staff members are responsible for adhering to professional standards and contributing to the overall quality of the audit function.

In light of the above, internal audit quality is undoubtedly a key aspect that contributes to the overall success of an organization and its ability to navigate challenges in a dynamic business environment.

CLASSIFICATION OF INTERNAL AUDIT QUALITY ASSESSMENT MODELS

A unified model for assessing internal audit quality has not yet been established in the literature, and several reasons contribute to this. Primarily, different types of organizations and variations in audit process approaches lead to diversity in existing models. Based on a review of available literature, two main groups of studies can be distinguished:

1. Studies examining indicators affecting internal audit quality: These studies focus on identifying and analyzing various factors and indicators, such as auditor competence, independence, integrity, and professional behavior, which may influence the quality of audit outcomes.
2. Studies examining how internal audit quality impacts or contributes to business performance: These studies explore how qualitative aspects of internal audit enhance overall organizational performance, improve operational efficiency, accountability, and strategic management.

More precisely established models for assessing internal audit quality can be classified based on several key methodologies used:

- **Models based on Structural Equation Modeling (SEM methodology)**: These are the most prevalent in the literature. They use structural equations to analyze complex relationships between variables and allow for simultaneous testing of multiple hypotheses.

- **Models based on factor analysis**: This method is used to identify latent structures within a dataset and can help in understanding key quality indicators.
- **Models based on regression analysis**: These methods focus on examining causal relationships between specific factors and internal audit quality.
- **Models based on Analytical Hierarchy Process (AHP),** which combine quantitative and qualitative criteria.

In addition to the methodologies used for developing internal audit quality assessment models, the literature also includes numerous studies based on systematic literature reviews. These studies provide a comprehensive overview of conducted research on internal audit quality, aiming to systematize the applied methodologies and identify key quality factors.

OVERVIEW OF INTERNAL AUDIT QUALITY ASSESSMENT MODELS

Authors **Ren Kai, Kong Yusheng, Albert Henry Ntarmah, and Chen Ti (2022)**, in their study "Constructing Internal Audit Quality Evaluation Index: Evidence from Listed Companies in Jiangsu Province, China, " focused on creating an Internal Audit Quality Evaluation Index. For their research, they used a sample of 27 publicly listed companies in Jiangsu Province, China. The sample included stakeholders relevant to internal audit quality research, such as internal auditors, management personnel, and audit committee members. A diverse group of experts was also involved, including domestic and international scholars specializing in corporate governance and internal audit.

In their study, the authors applied a combination of methodologies to develop the Internal Audit Quality Evaluation Index, with a strong emphasis on the Analytical Hierarchy Process (AHP). Other methodologies used included a systematic literature review, the Balanced Scorecard (BSC) approach, the Delphi method, and model evaluation techniques.

The researchers constructed a multi-layered internal audit quality evaluation index consisting of five dimensions, with indicators serving as variables to assess different aspects of internal audit quality. The five key established dimensions are (5):

1. Stakeholder satisfaction – includes 8 indicators
2. Stakeholder contribution – includes 9 indicators
3. Financial performance – includes 7 indicators
4. Internal audit process – includes 6 indicators
5. Learning and growth – includes 6 indicators

Accordingly, the study identified a total of 36 indicators for the Internal Audit Quality Evaluation Index. The research findings indicated that the internal audit process dimension was the most critical, while the degree of management's acceptance of internal audit

conclusions was highlighted as a key indicator of stakeholder satisfaction. The adoption and implementation of audit recommendations was considered the highest-priority indicator of financial performance. Additionally, the results reflected a broad consensus among stakeholders regarding the importance of these dimensions and indicators for the effective evaluation and enhancement of internal audit quality.

In the study "Determinants of Internal Audit Effectiveness (IAE) in the Ethiopian Public Enterprise, Case of Southern Region" by **Solomon Kebede Menza, Abraham Aga, and Wondwossen Jerene (2019)**, the authors focused on internal audits in 47 public sector organizations in Ethiopia. The total number of internal auditors in these public sector organizations comprised various organizational levels classified as core processing organizations and tier-level organizations. Accordingly, the study used a sample size of 118 internal auditors.

A mixed-methods approach (both qualitative and quantitative) was applied, integrating descriptive and econometric methods. Primary data were collected through questionnaires distributed to internal audit staff and interviews conducted with general managers/heads of organizations. Secondary data were obtained from reports and existing literature on internal audit effectiveness. The questionnaire was designed to quantify perceptions of internal audit effectiveness and its determinants, with a focus on various factors and indicators, including (7):

- Staff competence
- Independence of the internal audit department
- Availability of resources
- Management support
- Relationships between internal and external auditors
- Existence of an approved internal audit charter

While qualitative data were collected through interviews with key personnel to provide insight into the functioning and challenges of the internal audit system. The study employed an ordered logistic regression model for data analysis, assessing how different independent variables influence the effectiveness of internal auditing. The results indicate that strengthening the capacity and number of internal auditors is a key aspect of development strategies, but the quality and quantity of auditors remain a significant concern. In addition, the authors emphasize the following conclusions: that female auditors significantly enhance the effectiveness of internal auditing, that the presence of competent employees positively predicts the effectiveness of internal auditing, that the ability of internal auditors to work independently greatly influences their effectiveness, that the availability of both human and material resources predicts the effectiveness of internal auditing, that a smooth relationship between internal and external auditors significantly impacts effectiveness, and that the existence of a standardized and approved internal audit charter positively affects the effectiveness of internal auditing.

In the study "Determinant of Quality of Internal Audit Results with Work Experience As A Moderation" by **Tofan Wahyudi, Eny Rochaida, and Dirga Lestari (2021)**, the authors aimed to analyze and test various factors influencing the quality of internal audit results. The research involved a total of 74 respondents from the public sector. It is important to highlight that the authors measured several indicators related to each variable (11):

- Competence: Knowledge and expertise in auditing, self-development, understanding of audit techniques.
- Independence: Ability to work without bias, adherence to professional conduct, and maintaining facts unaffected by external influences.
- Integrity: Commitment to ethical standards, honesty, and reliability in reporting findings.
- Quality of audit results: Accuracy of findings, actionable recommendations based on audits.
- Work experience: Length of service, participation in audits, and the number of audit findings.

In the data analysis, the Structural Equation Modeling (SEM) approach was used, with hypothesis testing conducted through multivariate analysis using the SmartPLS software. The main findings of the study indicate the following: Competence has a negative and insignificant impact on the quality of audit results; Independence also shows a negative and insignificant impact on audit results; Integrity, on the other hand, has a positive and significant impact on the quality of audit results. The moderating effects of work experience on competence and independence concerning audit results are negative and insignificant, while the impact of integrity on audit quality with work experience as a moderating variable is also positive but insignificant. These results highlight the necessity of strengthening auditors' integrity and suggest that future research should further explore additional variables that may influence audit quality, such as accountability and professional prudence.

In the paper "The Influential Factors of Internal Audit Effectiveness: A Conceptual Model", authors **Ayman Abdelrahim and Husam-Aldin N. Al-Malkawi (2022)** conducted research using a systematic literature review. This methodology allowed for the precise collection of relevant data and analysis of existing studies to derive key insights into internal audit effectiveness. The sample for this complex research was obtained through an analysis of more than 5,000 papers, from which, after a detailed review and quality assessment, 34 scientific papers were selected. The sampling process covered an extensive time period from 1999 to 2022, ensuring the inclusion of a broad spectrum of research and reliance on reliable and up-to-date sources. The aim of this study was to identify key factors influencing internal audit effectiveness and integrate them into a conceptual model. The key factors identified in the study include (1):

- Organizational characteristics, which encompass the size of internal audit functions and their independence. These elements are crucial for ensuring professional

standards and the independent functioning of internal audit within the organizational structure.
- Relationships, which include quality collaboration with the audit committee and necessary support from senior management. These relationships significantly influence internal audit effectiveness, particularly regarding resources, support, and the adoption of recommendations.
- Internal audit processes, emphasizing the implementation of a risk-based approach, which allows for a focus on key risk areas within the organization, as well as a quality assurance program that standardizes and enhances the quality of audit processes.
- Resources, referring to the competencies of internal audit personnel, their knowledge, skills, and continuous training, as well as outsourcing, which enables organizations to access specialized experts whenever needed.
- Coordination, reflected in the implementation of a combined assurance model and close collaboration between internal and external auditors, ensuring greater efficiency and avoiding overlaps in audit activities.

The objective of the study "The Determinant of Audit Quality Based on the Internal Audit Capability Model (IACM)", by **S. Hastuti, R. P. Sari, and O. Tannar (2018)**, is to enhance auditors' expertise by analyzing the impact of competence, independence, obedience pressure, and the internal control system on the quality of audit results, using the Structural Equation Modeling approach. In other words, the study aims to establish factors influencing audit quality to provide practical guidelines for improving audit practices, increasing transparency, and promoting professionalism within internal audits in the public sector. For the purposes of this study, the authors collected data through survey questionnaires, allowing for a direct examination of auditors' perceptions and experiences concerning the research variables. The sample included a total of 53 internal audits in the public sector in Indonesia.

Through the conducted research, the authors identified the following key indicators affecting the quality of audit results (3):
- Competence: Reflects auditors' knowledge, expertise, and experience. Competent auditors ensure a higher-quality audit process by applying professional standards and providing valuable feedback to the organization's responsible bodies.
- Independence: The ability of auditors to act professionally and objectively, without external influence.
- Obedience pressure: The pressure exerted by superiors or other authorities on auditors to make decisions in favor of certain interests. This type of pressure reduces audit objectivity and can lead to ethical dilemmas and conflicts of interest.
- Internal control system: Includes audit processes, supervision, evaluations, and monitoring that ensure the timely detection of irregularities, abuse of authority,

and resource leakage. An effective internal control system helps organizations better track objectives and reduce risks.
- Quality of audit results: Measured through accuracy, objectivity, timeliness, and completeness of audit reports. High-quality audit results strengthen public trust and enhance transparency in governance.

The research results, through the analysis of the relationship between indicators and audit quality, established the following: Auditor competence has a positive and significant impact on the quality of audit outcomes. Independence did not have a significant effect on audit quality. Obedience pressure also did not have a significant impact on audit quality. However, it was observed that pressure from superiors often creates conflicts of interest and moral dilemmas for auditors, which can indirectly reduce the objectivity of reports. Additionally, an effective internal control system significantly influences audit quality, as it enables the early detection of irregularities and ensures that organizational goals are met. Therefore, it can be concluded that the research highlights the importance of key factors, particularly auditor competence and the internal control system, in ensuring high-quality audits. However, issues such as insufficient independence, obedience pressure, and limited resources remain obstacles to achieving better auditing practices. The introduction of additional training and the strengthening of control systems are recommended to improve audit processes in the public sector. The research also has practical implications for governments, which should further invest in enhancing the competencies and capacities of their auditors.

In the study by **Aida Krichene and Emna Baklouti (2020)**, "Internal Audit Quality: Perceptions of Tunisian Internal Auditors – An Explanatory Research," the aim was to understand how internal auditors in Tunisia perceive the quality of internal audits and to identify different auditor profiles based on their perception of the determinants of internal audit quality. The research aims to develop a model for measuring internal audit quality based on auditors' perceptions using specific factors influencing audit quality. The study sample consists of 104 internal auditors employed in Tunisia. In selecting the sample, a questionnaire with 22 items divided into five dimensions was used, covering auditors from both the private and public sectors. Factor analysis was applied to process the research data to extract the main factors and validate the model.

Based on the study, seven determinants of internal audit quality were identified (6):
- Internal auditor knowledge (education, certifications, experience, use of modern technology).
- Scope of internal auditors' work (ability to audit all parts of the organization).
- Independence in reporting (absence of external influence on audit findings).
- Adherence to professional standards (compliance with internal audit standards).
- Collaboration with external auditors (regular meetings and coordination).
- Access to information (free access to necessary data).

- Personal relationships of internal auditors (relationship with the management team and audit committee).

The research results indicate that the most important factors for internal audit quality are the scope of auditors' work and access to information, which most strongly explain audit quality. Less significant factors, such as internal auditor knowledge and collaboration with external auditors, did not have a significant impact on audit quality. As a conclusion, these factors contribute to improved management and better functioning of audit activities in Tunisian organizations.

"Factors Affecting the Internal Audit Effectiveness of Steel Enterprises in Vietnam" is a study by **The Hung Dinh, Duc Cuong Pham, and Tuan Thi Nguyen (2020)**. The research aimed to understand how internal audit characteristics—such as size, auditor capacity, scope, methods, independence, and operational foundation—contribute to increasing internal audit effectiveness. The sample includes 114 surveys collected from 38 enterprises in Vietnam during the 2018–2019 period. The sample comprises 38 internal auditors, 28 executive board representatives, and 38 board of directors' representatives. Data processing was conducted using factor analysis. Through the analysis, the researchers identified internal audit factors influencing its effectiveness: (2):

- Internal audit size (number of auditors in the organization).
- Internal auditor capacity (based on knowledge, experience, and skills).
- Internal audit scope (coverage of content, entities, and audit cycles).
- Internal audit methods (risk-based approach, advanced technology, and continuous auditing).
- Internal audit independence (access to information, authority, and reporting at the highest management level).
- Internal audit operational foundation (policies, annual plans, and quality assurance programs).
- Internal audit effectiveness (evaluated based on improvements in governance quality, compliance, risk reduction, and corporate governance enhancement).

By analyzing the collected data, the researchers identified the key factors influencing effectiveness. The most influential factor is the operational foundation and internal audit methods, while auditor capacity, audit scope, audit size, and independence also positively affect audit effectiveness, though with lower intensity. In this context, all examined factors have a positive impact on internal audit effectiveness. Based on the research findings, the authors provided recommendations for improvement, including strengthening the audit's operational foundation, implementing modern audit methods, increasing audit independence, expanding the audit scope, and increasing the size and capacity of audit staff. The results emphasize the importance of effective internal audits in improving management, reducing risks, and enhancing the overall efficiency of business operations in Vietnam's enterprises.

The study "Antecedents and Internal Audit Quality Implications of Internal Audit Effectiveness" by **Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, and Hasnah Haron (2021)** aims to better understand the factors contributing to internal audit effectiveness and to examine the relationship between internal audit and internal audit quality, which has direct implications for corporate governance in organizations. In other words, by achieving the study's objective, the authors seek to highlight specific factors that can help managers and internal audit leaders in designing and implementing effective internal controls and achieving better audit outcomes that support the continuous improvement of corporate practices and performance.

For conducting the research, the authors used a sample of 102 completed questionnaires from internal auditors and internal audit managers from 12 multinational companies in Malaysia. The indicators identified by the authors in this study are divided into indicators related to the efficiency of internal auditing and indicators related to the quality of internal auditing. The three main indicators influencing the efficiency of internal auditing are (8):

- Management Support: Refers to the level of support that management provides to internal auditors in carrying out their tasks. Key areas include providing resources necessary for the audit, including adequately trained personnel, involving management in audit planning, and ensuring a timely response to audit findings and recommendations.
- Support and Acceptance by Audited Departments: Involves the degree of cooperation and collaboration of audited departments with internal auditors. Indicators include easy access to documentation, information, and processes important for the audit, as well as the willingness of audited departments to accept audit results and recommendations.
- Coordination Between Departments: Encompasses the level of coordination between internal auditing and other functions within the organization. Indicators of coordination include collaboration and synchronization of tasks between departments for efficient audit execution, exchange of relevant information and reports to avoid overlapping work, and clarity in the division of responsibilities for internal audit tasks.

Furthermore, the quality of internal auditing is associated with three fundamental principles, which are also indicators of efficiency. As the authors state, these are the "pillars" of internal auditing (8):

- Independence: A fundamental criterion for effective auditing, referring to the freedom of auditors to operate without pressures, interference, or conflicts of interest. Key characteristics include internal auditors having full autonomy in accessing information and issues they deem relevant, as well as auditors not being directly influenced by management or audited departments.

- Objectivity: Implies impartiality in performing audit tasks and drawing conclusions. Key characteristics include internal auditors avoiding any conflicts of interest (e.g., auditing teams where friends or relatives work) and ensuring that audit findings are based on evidence rather than personal opinions.
- Competence: Refers to the ability and level of professional knowledge of the internal auditor. Key characteristics include auditors having relevant academic qualifications, holding professional certifications (such as Certified Internal Auditor – CIA), continuously enhancing their knowledge and skills through professional development, and possessing practical experience in the field of internal auditing.

The data were analyzed using structural equation modeling (SEM) with the SmartPLS 3.0 software. The analysis included model validation through reliability, convergent validity, and discriminant validity. The results of this study indicate that management support, coordination between departments, and support/cooperation from audited departments significantly impact the efficiency of internal auditing. Additionally, independence, objectivity, and competence in internal auditing positively influence the quality of internal auditing. Furthermore, based on the research findings, the authors highlight the important role of management. Its support is crucial for the efficiency of internal auditing through resources, training, and collaboration. The main conclusion of the study is that an efficiently conducted internal audit—one that is independent, objective, and competent—leads to higher-quality audits and improves organizational processes and compliance with corporate governance.

Based on the previously presented literature review on factors influencing the quality of internal auditing, Table 1 has been created. It presents the key specifics of the reviewed studies in terms of the sample and research methodology used, quality indicators, and key findings regarding the factors affecting the quality of internal auditing.

Based on the review of previous research, it can be concluded that there is no single methodology for studying the factors influencing internal audit quality. However, certain internal audit quality factors emerge as the most significant and frequently used in internal audit quality assessment models. Accordingly, Table 2 has been created below, highlighting the key internal audit quality factors identified in existing studies.

Table 1. Overview of Internal Audit Quality Assessment Models

Title of the Study, Authors, and Year of Publication	Constructing Internal Audit Quality Evaluation Index: Evidence from Listed Companies in Jiangsu Province, China Ren Kai, Kong Yusheng, Albert Henry Ntarmah, and Chen Ti (2022) (Originalni naslov: Constructing internal audit quality evaluation index: evidence from listed companies in Jiangsu province, China) Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022)
Sample and Methodology	Sample: 27 publicly listed companies in Jiangsu Province, China. Methodology: Analytic Hierarchy Process (AHP).
Indicators	36 indicators categorized into five dimensions: • Satisfaction (8 indicators) • Stakeholder Contribution (9 indicators) • Financial Performance (7 indicators) • Internal Audit Process (6 indicators) • Learning and Growth (6 indicators).
Results	• The internal audit process dimension is the most critical • The degree of management's acceptance of internal audit conclusions is a key indicator of stakeholder satisfaction • There is stakeholder agreement on the importance of dimensions and indicators for effectively assessing and improving internal audit quality • A combined methodological research approach ensured a comprehensive, reliable, and valid internal audit quality evaluation index

Title of the Study, Authors, and Year of Publication	Determinants of Internal Audit Effectiveness (IAE) in the Ethiopian Public Enterprise, Case of Southern Region Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019)
Sample and Methodology	Sample: 118 internal auditors from the public sector. Methodology: Regression analysis.
Indicators	• Staff competence • Independence of the internal audit department • Availability of resources • Management support • Relationships between internal and external auditors • Existence of an approved internal audit charter.
Results	• The importance of internal audit effectiveness for better governance and resource management in public sector offices • Strengthening support mechanisms for internal auditors, focusing on competency development, ensuring independence, and fostering collaboration between internal and external auditors • The presence of an audit charter is a critical determinant of internal audit effectiveness in the public sector.

Title of the Study, Authors, and Year of Publication	Determinant of Quality of Internal Audit Results with Work Experience As A Moderation Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021)
Sample and Methodology	Sample: 74 respondents from the public sector. Methodology: Structural Equation Modeling (SEM) using SmartPLS software.
Indicators	• Competence: Knowledge and expertise in auditing, self-development, understanding of audit techniques. • Independence: Ability to work without bias, adherence to ethical behavior, and maintaining facts unchanged by external influences. • Integrity: Commitment to ethical standards, honesty, and reliability in reporting findings. • Audit Results Quality: Accuracy of findings, actionable recommendations based on audits. • Work Experience: Length of service, participation in audits, and number of audit findings..
Results	• Competence has a negative and insignificant impact on audit result quality; Independence has a negative and insignificant impact on audit results; • Integrity has a positive and significant impact on audit result quality; The moderating effects of work experience on competence and independence concerning audit results are negative and insignificant; • The impact of integrity on audit quality, with work experience as a moderating variable, is positive but insignificant.

Title of the Study, Authors, and Year of Publication	The Influential Factors of Internal Audit Effectiveness: A Conceptual Model Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022)
Sample and Methodology	Sample: 34 scientific studies. Methodology: Systematic literature review.
Indicators	Five key factors of internal audit and their dimensions: • Organizational characteristics of internal audit (independence and size of internal audit) • Internal audit relationships (relationship with the audit committee and support from senior management) • Internal audit processes (risk-based audit implementation and quality assurance and improvement program) • Internal audit resources (competencies of internal auditors and outsourcing of internal audit) • Coordination with other assurance providers (leading the implementation of combined assurance and coordination with external auditors)
Results	The authors emphasize the importance of each factor for the effectiveness of internal audit, providing a foundation for future research and model testing.

Title of the Study, Authors, and Year of Publication	The Determinant of Audit Quality Based on the Internal Audit Capability Model (IACM) S. Hastuti, R. P. Sari, O. Tannar (2018)
Sample and Methodology	Sample: Consists of 53 internal audits in the public sector in Indonesia. Methodology: Structural Equation Modeling (SEM).
Indicators	Internal audit quality factors are grouped into five categories: • Competence • Independence • Obedience pressure • Internal control system • Quality of audit results
Results	• Auditor competence has a positive and significant impact on the quality of audit results. • Independence did not have a significant impact on audit quality. • Obedience pressure also did not have a significant impact on audit quality. • An effective internal control system significantly influences audit quality by enabling early detection of irregularities and ensuring that organizational goals are achieved.

Title of the Study, Authors, and Year of Publication	Internal Audit Quality: Perceptions of Tunisian Internal Auditors – An Explanatory Research Aida Krichene i Emna Baklouti (2020)
Sample and Methodology	Sample: 104 auditors from the private and public sectors in Tunisia. Methodology: Factor analysis.
Indicators	Internal audit quality factors: • Internal auditor's knowledge • Scope of the internal auditor's work • Independence in reporting • Compliance with professional standards • Cooperation with external auditors • Access to information • Personal relationships of the internal auditor
Results	• The scope of the auditor's work and access to information are the most significant factors in explaining audit quality. • Less significant factors: The internal auditor's knowledge and cooperation with external auditors did not have a significant impact on audit quality.

Title of the Study, Authors, and Year of Publication	Factors Affecting the Internal Audit Effectiveness of Steel Enterprises in Vietnam The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Sample and Methodology	Sample: 114 survey responses collected from 38 enterprises in Vietnam during the period 2018–2019. Methodology: Factor analysis method.
Indicators	Internal Audit Factors: • Knowledge of the internal auditor • Scope of the internal auditor's activities • Independence in reporting • Compliance with professional standards • Collaboration with external auditors • Access to information • Personal relationships of the internal auditor
Results	The most influential factor is the operational foundation and methods of internal auditing, while auditor capacity, audit scope, audit size, and independence also positively impact audit effectiveness but with less intensity.

Title of the Study, Authors, and Year of Publication	Antecedents and Internal Audit Quality Implications of Internal Audit Effectiveness Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Sample and Methodology	Sample: 102 completed questionnaires from auditors and heads of internal audit departments from 12 companies in Malaysia. Methodology: Structural Equation Modeling (SEM) using SmartPLS 3.0 software.
Indicators	Indicators of Internal Audit Effectiveness: • Management support • Support and acceptance from audited departments • Coordination between departments Indicators of Internal Audit Quality: • Independence • Objectivity • Competence
Results	• Key findings indicate that management support, interdepartmental coordination, and cooperation with audited departments significantly impact internal audit effectiveness. • Independence, objectivity, and competence positively influence internal audit quality.

Table 2. Key Internal Audit Quality Factors Identified in Studies, Ranked by the Number of Studies

Indicator	Number of Studies	Authors (Year)
Competence	7	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Independence	7	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Access to Information	4	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Compliance with Professional Standards	4	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Collaboration with External Audit	4	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • Aida Krichene i Emna Baklouti (2020) • The Hung Dinh, Duc Cuong Pham i Tuan Thi Nguyen (2020)
Internal Audit Processes	3	• Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018)
Management Support	3	• Solomon Kebede Menza, Abraham Aga, Wondwossen Jerene (2019) • Ayman Abdelrahim i Husam-Aldin N. Al-Malkawi (2022) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Objectivity	2	• Tofan Wahyudi, Eny Rochaida i Dirga Lestari (2021) • Karpal Singh Dara Singh, Sajitha Ravindran, Yuvaraj Ganesan, Ghazanfar Ali Abbasi, i Hasnah Haron (2021)
Satisfaction	2	• Ren Kai, Kong Yusheng, Albert Henry Ntarmah i Chen Ti (2022) • S. Hastuti, R. P. Sari, O. Tannar (2018)

CONCLUSION

Internal audit plays a key role in improving the operations of an organization by providing independent and objective assurance, contributing to the effectiveness of management, control, and risk management processes. The quality of internal audit significantly impacts the overall trust of stakeholders and the success of the organization, especially through its contribution to credibility, compliance with laws and standards, and the efficiency of organizational processes (2). The quality of internal audit not only ensures transparency and accountability within the organization but also contributes to its long-term sustainability in a dynamic business environment (12).

The quality of internal audit must be continuously evaluated to identify the factors that contribute to the quality of internal audit, and to pinpoint critical areas concerning the quality of internal audit. The most significant factors influencing the quality of internal audit are the competence and independence of internal audit. These factors form the foundation for the proper establishment and functioning of internal audit. The responsibility for the quality of internal audit primarily lies with the head of the internal audit department. It is in the interest of the head of the internal audit department, as well as in the interest of management, the board, and the entire organization in which internal audit operates, to continuously improve the quality of internal audit. Through research on the factors influencing the quality of internal audit, key factors that positively or negatively affect internal audit quality can be identified, and accordingly, specific steps can be taken to improve the quality of internal audit.

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Bane Avramović[1]
Tamara Naumović[2]
Dušan Kostić[3]
Miloš Jolović[4]
Vukašin Despotović[5]

ORIGINAL RESEARCH PAPER
UDC 336:005.332.7
004
DOI: 10.46793/Rev25109.105A
Received: 19.02.2025.
Accepted: 17.03.2025.
Published: 31.03.2025.

Blockchain Technology and Decentralized Finance: Theory and Practice in Cryptocurrency Creation

Summary: *Blockchain technology represents a revolutionary concept in the field of digital economy, enabling security, transparency, and decentralization of data and transactions. This paper explores the fundamental principles of blockchain technology, the role of cryptocurrencies, and the development of decentralized finance (DeFi). It analyzes key differences between centralized and decentralized exchanges, as well as the significance of DeFi applications in the modern financial ecosystem. Additionally, through a case study, the paper presents the process of creating a new cryptocurrency—ELAB—including the implementation of a smart contract on the Binance Smart Chain network and token distribution. The main goal of the paper is to provide both theoretical and practical insights into the fundamental concepts of blockchain and its application in real-world systems. The study's results demonstrate how cryptocurrencies can be utilized in various contexts, including the educational system, where gamification through digital tokens can enhance student engagement.*

Keywords: *blockchain, cryptocurrencies, decentralized finance*

[1] University of Belgrade, Faculty of Organizational Sciences.
E-mail: bane.avramovic@gmail.com

[2] University of Belgrade, Faculty of Organizational Sciences.
E-mail: tamara.naumovic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0001-9849-7665

[3] University of Belgrade, Faculty of Organizational Sciences.
E-mail: dk20243269@student.fon.bg.ac.rs

[4] University of Belgrade, Faculty of Organizational Sciences.
E-mail: mj20243254@student.fon.bg.ac.rs

[5] University of Belgrade, Faculty of Organizational Sciences.
E-mail: vd20225086@student.fon.bg.ac.rs

INTRODUCTION

Blockchain technology is one of the key innovations in the modern digital world, enabling security, decentralization, and transparency of data and transactions (Bogdanović et al., 2019). Structurally, blockchain is a distributed ledger that records transactions in linked blocks, ensuring resistance to forgery and censorship (Barney et al., n.d.). Its applications extend far beyond financial transactions, including healthcare, education, cybersecurity, and the entertainment industry.

A particularly significant application of blockchain is in the development of cryptocurrencies, digital assets that facilitate peer-to-peer transactions without intermediaries (Pernice & Scott, 2021). Cryptocurrencies such as *Bitcoin* and *Ethereum* form the foundation of the crypto economy, while new concepts like *StableCoins* and decentralized finance (*DeFi*) are redefining traditional financial models (Milutinović, 2018). DeFi allows users to access financial services such as lending, trading, and saving without intermediaries like banks or other centralized institutions, using blockchain-based decentralized applications (*dApps*) (Jensen et al., 2021; Johnson, 2021).

In addition to providing a theoretical overview of key blockchain and cryptocurrency concepts, this paper focuses on the practical aspect by presenting the creation of a new cryptocurrency—ELAB. Using *Binance Smart Chain* as a case study, it details the implementation of a smart contract, token creation, and distribution process. Furthermore, the potential application of such solutions in education is explored through the introduction of a blockchain-based reward system.

The following sections first review the literature and fundamental principles of blockchain technology and cryptocurrencies. Then, decentralized finance and its applications are discussed, followed by a case study on the creation and distribution of the ELAB cryptocurrency. Finally, the paper explores future possibilities for blockchain technology in education and other sectors.

BLOCKCHAIN TECHNOLOGY

Blockchain can be defined as a digital *ledger* that records all transactions occurring within a network of computers, ensuring transparency, security, and immutability of recorded data (Bogdanović et al., 2019; Nofer et al., 2017). The term *blockchain* comes from the way transactions are stored in a network—blocks. Each individual block in the chain contains transactions, and whenever a new transaction occurs on the blockchain, it is recorded in the ledger of every participant. A database managed by multiple participants is called a decentralized database or *distributed ledger technology* (*DLT*) (Barney et al., n.d.) (Liu et al., 2020).

Blockchain technology provides a solution to the issues of centralized systems, which allow the most powerful users to control publicly visible information, thereby limiting

the system while other users make decisions solely based on available data (Bogdanović et al., 2019). If someone wanted to compromise a blockchain system, they would need to alter every block in the chain across all distributed versions of the ledger. To carry out such an attack, a hacker would need to control 51% of the entire chain, which is extremely difficult in well-developed blockchain networks (Ye et al., 2018).

There are two main types of blockchain networks—private and public (Bogdanović et al., 2019; Wegrzyn & Wang, 2021). Public or "permissionless" blockchains allow anyone to participate in financial transactions without requiring identification (Guegan, 2017). Public blockchains usually have a native cryptocurrency, and consensus is often achieved through economic incentives and the implementation of *Proof-of-Work* (*PoW*) (Montevirgen, 2022; Sriman et al., 2021).

On the other hand, private or "permissioned" blockchains require participant identity verification (Guegan, 2017; Hao et al., 2018; Wegrzyn & Wang, 2021). In private blockchains, interactions between a group of participants with a shared goal—but without complete trust in each other—can still be secured (e.g., transactions involving the exchange of goods, information, or assets). Blockchain technology has various applications, including the music industry, healthcare, education, cybersecurity, and many others (Hao et al., 2018; Wegrzyn & Wang, 2021).

TOKENS AND CRYPTOCURRENCIES

Blockchain tokens are digital entities that facilitate ownership, transfer, and management of various assets, rights, or values within decentralized networks. (Bogdanović et al., 2019). These tokens operate based on distributed ledger technology (DLT) principles and can be used for a wide range of applications, including digital currencies, ownership instruments, access keys, and system rewards (Schwiderowski et al., n.d.).

There are several key categories of blockchain tokens (Oliveira et al., 2018):

- *Payment tokens* are used as digital money and enable direct peer-to-peer transactions without intermediaries, with Bitcoin and Ethereum being the most well-known examples.
- *Utility* tokens provide access to specific services or functionalities on blockchain platforms.
- *Asset* tokens represent digitalized forms of real-world assets, such as stocks, real estate, or artworks. This classification helps in understanding the different roles of tokens in the digital economy and enables regulatory bodies to apply appropriate legal frameworks.

One of the main challenges in the token economy is interoperability between different blockchain networks, which can affect token usability and value. While private

blockchain networks offer greater control over interaction and transaction rules, public blockchain systems provide higher transparency and decentralization but also present regulatory and scalability challenges (Sunyaev et al., 2021).

Payment tokens can be categorized as either native or tokenized (Oliveira et al., 2018; Schwiderowski et al., n.d.):

- Native tokens are the fundamental tokens of a blockchain network, serving as its primary medium of exchange and payment. They are directly linked to the blockchain on which they operate. *Bitcoin* (BTC) is the first and most well-known example of a native token, designed exclusively as a digital currency that enables *peer-to-peer* transactions without the need for centralized authorities. Similarly, *Ether* (ETH), while primarily used to execute smart contracts on the *Ethereum* network, also functions as a payment token to cover transaction fees (*gas fees*).
- Tokenized payment tokens are tokens created on existing blockchain networks using standardized protocols such as ERC-20 (*Ethereum*) or BEP-20 (*Binance Smart Chain*). These tokens do not have their own blockchain but instead utilize the infrastructure of existing networks to facilitate transactions. Examples include USDT (*Tether*) and USDC (*USD Coin*), which are *StableCoins* pegged to the value of traditional fiat currencies to reduce volatility.

The development of tokenized ecosystems creates opportunities for entirely new business models, including decentralized finance (DeFi), where tokens allow users to lend, invest, and insure assets without the need for traditional banking institutions. Additionally, the growing adoption of *non-fungible* tokens (NFTs) demonstrates how blockchain can transform the art and creative industries by enabling the creation of digital proof of ownership that is immutable and verifiable within blockchain networks (Schwiderowski et al., n.d.).

Cryptocurrencies

Cryptocurrencies are digital or virtual forms of currency that use cryptography to secure payments and eliminate the need for intermediaries in transactions (Milutinović, 2018). These currencies can be obtained through *mining* on a blockchain network or by purchasing them on crypto exchanges. They rely on various encryption methods, such as public-private key pairs and *hash* functions (Pernice & Scott, 2021). Although cryptocurrencies like *Bitcoin* are rarely used for everyday purchases, they have gained popularity as financial instruments due to their increasing value and the ability to transfer funds across borders (Burniske & Tatar, 2018).

The blockchain infrastructure is responsible for the *Bitcoin* revolution (Tapscott & Kaplan, 2019). *Bitcoin* is a cryptocurrency that ensures security and trust through verification and validation programs for transactions (Lewis, 2018). Because blockchain networks

operate independently of any centralized institution, *Bitcoin* is not controlled by traditional central payment systems or banking authorities (Lewis, 2018; Pernice & Scott, 2021).

Leading blockchain technologies of major cryptocurrencies and their networks, such as *Bitcoin*, *Ethereum*, and *Binance*, continue to grow. As their adoption increases, new blocks are added to the chain, significantly enhancing the security of transaction records (Burniske & Tatar, 2018). As a cryptocurrency, *Bitcoin* uses decentralized cryptographic tools and a *peer-to-peer* system to allow users to transfer money without relying on centralized trusted entities like payment processors or banks (Lewis, 2018; Nakamoto, n.d.). On the other hand, *Ethereum*, as a platform for smart contracts, and its native cryptocurrency *Ether* (*ETH*), enables users not only to transfer money but also to develop and execute decentralized applications (*dApps*) without relying on centralized intermediaries such as traditional servers or financial institutions (Arslanian, 2022; Tikhomirov, 2018). Additionally, the *Binance* blockchain ecosystem and its cryptocurrency *Binance Coin* (BNB) utilize both decentralized and centralized infrastructures to facilitate value transfers, trading, and interaction with the *Binance Smart Chain* network. This provides users with options for transactions, payments, and launching decentralized applications, while also offering additional liquidity and services through the centralized *Binance* exchange (Cernera et al., n.d.; Kaur, 2023; Nugroho & Setiawan, 2023).

As of September 2024, the cryptocurrency market is in a stabilization phase. The total market capitalization of cryptocurrencies amounts to $2.2 trillion, according to https://coinmarketcap.com/.

Most popular cryptocurrencies have their own blockchain and native currency, such as *Bitcoin*, *Ethereum*, *BNB*, *XRP*, and *Solana*. In addition to these, there are also cryptocurrencies classified as *StableCoins*, such as *Tether* (*USDT*) and *USD Coin* (*USDC*). A *StableCoin* is a type of cryptocurrency that is usually pegged to a specific fiat currency, such as the US dollar, euro, or yen (Sidorenko, 2019). There are also special cases of *StableCoins* backed by gold or other cryptocurrencies, although they are less commonly used.

DECENTRALIZED EXCHANGES AND DECENTRALIZED FINANCE

Crypto exchanges base their business on facilitating the buying and selling of cryptocurrencies while charging a transaction fee (Brasse & Hyun, 2023; Johnson, 2021). Larger exchanges also offer savings options, similar to traditional banking systems. In such systems, users receive interest on their savings, often at higher rates than those offered by traditional banks (Wembo, 2025).

The cryptocurrency market is highly dynamic and subject to significant changes due to its relatively short history. However, new laws and regulations help mitigate risks and fluctuations. Major crypto exchanges in the United States operate under the supervision of government agencies (Johnson, 2021).

Centralized exchanges (*CEX*) are organizations that coordinate large-scale cryptocurrency trading using a business model similar to traditional exchanges (George, 2023).

In contrast, *decentralized exchanges* (*DEX*) operate without central authority, but they remain less common than their centralized counterparts, which still account for approximately 90% of all crypto exchanges (George, 2023).

The largest exchange by transaction volume is *Binance*, processing around $20 billion in daily transactions (Brasse & Hyun, 2023). *Binance* operates as a centralized exchange but has also launched a decentralized division. It has its own cryptocurrency, *Binance Coin* (BNB), and a proprietary blockchain, *Binance Smart Chain* (BSC) (Kaur, 2023; Nugroho & Setiawan, 2023). By developing its own blockchain, *Binance* has actively entered the decentralized exchange market (Lehar & Parlour, 2021).

Originally, *Binance Coin* (BNB) was based on the *Ethereum* blockchain, following the *ERC-20* token standard (*ERC-20 Token Standard*, n.d.). It later became the native token of the *Binance* Chain. *BNB* was launched in July 2017, with an initial supply of 200 million tokens (Kaur, 2023).

Currently, *BNB* is the sixth-largest cryptocurrency by market capitalization, valued at approximately $91.7 billion (*Cryptocurrency Prices, Charts And Market Capitalizations | CoinMarketCap*, n.d.). *Binance's* growth has played a significant role in BNB's success.

Binance DEX is a decentralized exchange that aims to bring key features of the *Binance* platform into a decentralized environment, offering security and other *DEX* advantages (Asef et al., 2024). *Binance Chain* is the foundation of this exchange, with a primary focus on fast and efficient asset exchange management. Binance DEX enables the receiving and sending of Binance Coin (BNB) between different addresses (Asef et al., 2024; Brasse & Hyun, 2023; Cernera et al., n.d.). BNB has been converted into the native coin of the *Binance Chain*, increasing its use for fees and transactions (Kaur, 2023).

Decentralized Finance (DeFi) is a movement that promotes financial services such as lending and trading without centralized intermediaries (Jensen et al., 2021). These services are enabled through decentralized applications (dApps), most of which are built on the *Ethereum* platform. DeFi encompasses banking, bonds, money markets, and insurance, replicating traditional financial systems within decentralized networks (Jensen et al., 2021).

Key Categories of DeFi (Jensen et al., 2021):

1. *Decentralized Exchanges (DEX)*
   These platforms allow users to exchange cryptocurrencies without the involvement of any centralized third party, while also enabling them to retain full control over their digital assets. By not storing funds on centralized exchanges, users avoid the need to trust the solvency of those platforms.
2. *DeFi Lending and Borrowing*
   This type of lending allows users to deposit their own digital assets as collateral, in exchange for which they can obtain an appropriate loan. Digital assets can also serve as a means of saving, allowing users to participate in the lending market and earn interest on their deposits. This lending and borrowing system completely

eliminates the need for credit rating checks, creditworthiness assessments, or even bank accounts.

3. *Decentralized Stablecoins*
   A concept that addresses trust issues. *Stablecoins* are created using over-collateralization methods, recorded in decentralized ledgers, and managed by decentralized autonomous entities. The reserves of *StableCoins* are fully transparent and publicly available for verification.

In addition to these crucial factors, many others contribute to the growth of the decentralized sector, including payments, financial management, insurance or funds, derivatives, and various other elements (CoinGecko et al., 2021; Lau et al., 2021).

The sector of decentralized applications and organizations is showing a growth trend. Following the last recession, corrective and stabilization measures were implemented across the entire DeFi market, which currently has a capitalization of approximately $100.6 billion (*Total DeFi Market Cap Chart — TradingView*, n.d.).

The DeFi sector is continuously evolving, emphasizing accessibility and ease of creation, which attracts a significant number of new investors. Among the many functionalities this sector offers are (CoinGecko et al., 2021; Lau et al., 2021):

- Wallets – **Argent** provides a dramatically superior user-focused crypto wallet with state-of-the-art security, seamless local integration with DeFi decentralized applications such as *Compound* and others, as well as options that do not require *seed* keys.
- DeFi Portfolio Management – **Zapper** efficiently abstracts complex processes and steps involved in managing DeFi portfolios, applications, and products. Additionally, it enables users to easily access various financial assets within a single platform, significantly saving time and effort.
- Automated Transactions – **Gelato Finance** has introduced a mechanism known as an event-driven crypto transaction reactor. This tool allows users to define specific activities that will be executed automatically when certain conditions are met, such as "Buy Ether when the price reaches $200" or "Send cryptocurrency to Alice on her birthday."
- Insurance – **Nexus Mutual** serves as an example of guarantee and protection mechanisms. The platform allows users to secure their digital assets, functioning on a community-based model where members can invest in insurance and collectively decide on payouts covering potential incidents.

Given the expansion of this sector, proper regulations and easier user access are essential to ensure its continued growth (Bogdanović et al., 2019; Brasse & Hyun, 2023; Johnson, 2021).

CASE STUDY - ELAB CRYPTOCURRENCY

The case study presented in the following section demonstrates the process of creating a cryptocurrency. When developing a cryptocurrency, it is necessary to write, develop, and test a smart contract on a blockchain network. Every transaction, including testing, requires the use of cryptocurrency in a specific amount. However, for testing purposes, a test network and test tokens provided by each blockchain network are used (Bogdanović et al., 2019; Gururaj et al., 2020; Nofer et al., 2017). These test tokens are obtained through *faucets* (*What Is a Crypto Faucet? | Coinbase*, n.d.).

Initially, it is necessary to create a digital wallet, which enables cryptocurrency transactions and storage, as well as the creation of a new cryptocurrency. A wallet can be either software-based or hardware-based and serves to store information about the owner's private blockchain keys, execute transactions on a blockchain network, and store information about the owner's cryptocurrencies (Mackay, 2019). For the purpose of this case study, a software cryptocurrency wallet—*Metamask*—was used.

The case study was implemented on the *Binance Smart Chain TestNet* blockchain network. Every major blockchain network has its own test version, which allows for testing decentralized applications without the need to spend real cryptocurrency assets. Migrating from a test network to a live network requires only a few additional steps in a standardized procedure.

The *Binance Smart Chain* network is based on the *Ethereum* blockchain, meaning that the *Solidity* programming language is used to create the smart contract, i.e., the cryptocurrency (koinmilyoner, 2023).

The process of creating a smart contract is illustrated in Figure 1.

```
contract ERC20 is Context, IERC20, IERC20Metadata {
    mapping(address => uint256) private _balances;
    mapping(address => mapping(address => uint256)) private _allowances;

    uint256 private _totalSupply;

    string private _name;
    string private _symbol;

    constructor(string memory name_, string memory symbol_) {
        _name = name_;
        _symbol = symbol_;
}
}
```

Figure 1: Smart Contract Creation

The provided code segment creates an ERC20 smart contract that defines the rules for token creation. The *_balances* mapping stores data on each user's balance, indicating how many tokens each address (user) owns. The *_allowances* mapping keeps track of how many tokens one address (user) is allowed to spend on behalf of another address (user). The *_totalSupply* variable specifies the total amount of tokens issued within the system.

The *_name* and *_symbol* variables store the token's name and symbol, which are used to identify the token in the market.

The constructor is called when the contract is deployed on the blockchain network. It takes two parameters for token identification and initializes them with specific values.

After creating the contract, functions are programmed to provide specific functionalities within the system. Figure 2 shows a function that retrieves the balance, i.e., the account status, of a specific user.

```
function balanceOf(address account) public view virtual override
returns (uint256) {
return _balances[account];
}
```

Figure 2: Current Account Balance

```
function transfer(address to, uint256 amount) public virtual override
returns (bool) {
address owner = _msgSender();
_transfer(owner, to, amount);
return true;
```

Figure 3: Fund Transfer

```
function _transfer(
    address from,
    address to,
    uint256 amount
) internal virtual {
    require(from != address(0), "ERC20: transfer from the zero address");
    require(to != address(0), "ERC20: transfer to the zero address");

    _beforeTokenTransfer(from, to, amount);

    uint256 fromBalance = _balances[from];
    require(fromBalance >= amount, "ERC20: transfer amount exceeds balance");
    unchecked {
        _balances[from] = fromBalance - amount;
    }
    _balances[to] += amount;
    emit Transfer(from, to, amount);

    _afterTokenTransfer(from, to, amount);
}
```

Figure 4: Implementation of the Fund Transfer Function

Figure 3 represents a function that allows a specific address (*owner*) to send a certain amount of cryptocurrency (*amount*) to another address (*to*). The condition for successfully executing this function is that the amount of cryptocurrency being sent must be non-negative.

The *_transfer* function shown in Figure 4 contains the logic behind transferring funds from one address to another. The function verifies that sending to or from the null address is not allowed, as it may lead to fund loss, and it triggers the *_beforeTokenTransfer* function, which contains code segments for validation and transaction tracking before the actual transfer. The function then checks whether the sender has enough tokens, deducts the transferred amount from the sender's balance, and increases the recipient's balance by the same amount. Finally, the function calls *_afterTokenTransfer*, which may also contain logic for tracking transactions or gathering transaction statistics.

```
contract Token is ERC20 {

constructor () public ERC20("ELAB", "ELAB") {
    _mint(msg.sender, 1000000000 * (10 ** uint256(decimals())));
}

}
```

Figure 5: ERC20 Contract

A specific instance of the ERC20 contract used to create the Elab cryptocurrency with an issuance of one billion units is shown in Figure 5. After completing the coding phase, *deployment* is required to release the newly created cryptocurrency into circulation (Figure 6). Deploying the cryptocurrency and making it available for use requires paying blockchain network fees (Figure 7).

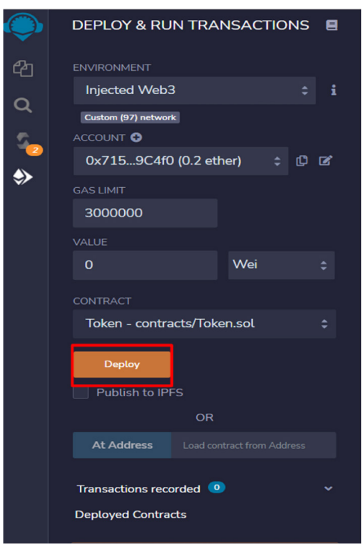

Figure 6: Cryptocurrency Deployment

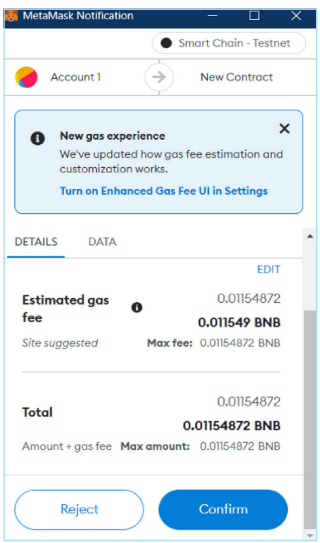

Figure 7: Fees for Creating and Deploying the Cryptocurrency

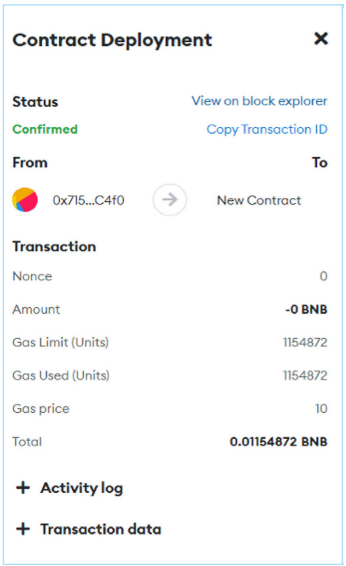

Figure 8: Successful Smart Contract Deployment

After successfully paying the required fees, we receive a confirmation message indicating the successful deployment of our smart contract (Figure 8).

DISCUSSION

The process of creating the ELAB cryptocurrency in this research demonstrates how blockchain technology can enable the development of customized digital tokens with specific functionalities. Using smart contracts on the Binance Smart Chain network allows for efficient and transparent management of token distribution, while digital wallets like MetaMask provide an easy way to store and use them. This process highlights that cryptocurrency creation is not limited to global financial institutions but can also be applied in specialized sectors such as education, financial instruments, and digital identities.

The distribution of cryptocurrency is based on a simple principle, considering that a specific number of created ELAB tokens is initialized to the primary address. All that is needed for distribution are the recipient addresses to which specific amounts of the token should be sent.

The potential use of ELAB tokens remains open for further discussion. One proposed application scenario is in the education system, where tokens could serve as a tool for gamifying the learning process. Students could use the ELAB cryptocurrency as a reward system for academic achievements or as a means of validating participation in courses and projects. Such a model could enhance student engagement and increase the transparency of assessment and certification processes.

However, questions regarding the further development and integration of such systems arise. Could these tokens hold value beyond the internal ecosystem, and would regulatory frameworks recognize them as legitimate means of exchange? Additionally, how can the long-term sustainability of tokens be ensured, preventing speculation and potential regulatory hurdles? Further research is needed to test the stability, acceptance, and security of such models in real-world applications.

CONCLUSION

This study explored the fundamental concepts of blockchain technology, cryptocurrencies, and decentralized finance, with a particular focus on the process of creating and distributing customized tokens. Through a detailed literature analysis and the ELAB cryptocurrency case study, the research demonstrated the practical application of smart contracts and decentralized technologies in the development of digital assets.

The main contribution of this work lies in connecting theoretical foundations with a practical experiment in cryptocurrency creation, providing insights into the possibilities that blockchain offers beyond traditional financial flows. The case study highlights the potential application of tokens in education, enabling greater transparency and efficiency in evaluation through decentralized reward systems.

The obtained results open up numerous new questions and directions for future research. Further work could include analyzing the regulatory aspects of token creation, testing tokenization models in various sectors, and exploring the long-term sustainability of such systems. Blockchain technology continues to evolve, offering new opportunities for the digitalization of financial and non-financial resources, and such experiments contribute to a better understanding and adaptation of this innovative approach across different domains.

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Bane Avramović[1]
Tamara Naumović[2]
Dušan Kostić[3]
Miloš Jolović[4]
Vukašin Despotović[5]

ORIGINALNI NAUČNI RAD
UDK 336:005.332.7
004

Primljen: 19.02.2025.
Prihvaćen: 17.03.2025.
Objavljen: 31.03.2025.

Blokčejn tehnologija i decentralizovane finansije: Teorija i praksa u kreiranju kriptovalute

Rezime: *Blokčejn tehnologija predstavlja revolucionarni koncept u oblasti digitalne ekonomije, omogućavajući sigurnost, transparentnost i decentralizaciju podataka i transakcija. Ovaj rad istražuje osnovne principe blokčejn tehnologije, ulogu kriptovaluta i razvoj decentralizovanih finansija (DeFi). Analiziraju se ključne razlike između centralizovanih i decentralizovanih menjačnica, kao i značaj DeFi aplikacija u savremenom finansijskom ekosistemu. Takođe, kroz studijski primer prikazuje se proces kreiranja nove kriptovalute - ELAB, uključujući implementaciju pametnog ugovora na Binance Smart Chain mreži i distribuciju tokena. Glavni cilj rada je da pruži teorijski i praktični uvid u fundamentalne koncepte blokčejna i njegovu primenu u realnim sistemima. Rezultati rada pokazuju kako se kriptovalute mogu koristiti u različitim kontekstima, uključujući obrazovni sistem, gde gejmifikacija putem digitalnih tokena može doprineti povećanju angažovanosti studenata.*

Ključne reči: *blokčejn, kripto valute, decentralizovane finansije*

[1] Univerzitet u Beogradu, Fakultet organizacionih nauka.
E-mail: bane.avramovic@gmail.com

[2] Univerzitet u Beogradu, Fakultet organizacionih nauka.
E-mail: tamara.naumovic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0001-9849-7665

[3] Univerzitet u Beogradu, Fakultet organizacionih nauka.
E-mail: dk20243269@student.fon.bg.ac.rs

[4] Univerzitet u Beogradu, Fakultet organizacionih nauka.
E-mail: mj20243254@student.fon.bg.ac.rs

[5] Univerzitet u Beogradu, Fakultet organizacionih nauka.
E-mail: vd20225086@student.fon.bg.ac.rs

UVOD

Blokčejn tehnologija predstavlja jednu od ključnih inovacija u savremenom digitalnom svetu, omogućavajući sigurnost, decentralizaciju i transparentnost podataka i transakcija (Bogdanović et al., 2019). Po svojoj strukturi, blokčejn je distribuirana knjiga (ledger) koja beleži transakcije u povezanim blokovima, obezbeđujući imunitet na falsifikovanje i cenzuru (Barney et al., n.d.). Njegova primena seže daleko van granica finansijskih transakcija, uključujući oblasti zdravstva, obrazovanja, sajber bezbednosti i industrije zabave.

Posebno značajnu primenu blokčejn ima u razvoju kriptovaluta, digitalnih sredstava koja omogućavaju peer-to-peer transakcije bez posrednika (Pernice & Scott, 2021). Kriptovalute poput Bitkoina (eng. *Bitcoin*) i Eterijuma (eng. *Ethereum*) predstavljaju osnovu kriptoekonomije, dok novi koncepti, poput stabilnih kriptovaluta (eng. *StableCoin*) i decentralizovanih finansija (*DeFi*), redefinišu tradicionalne finansijske modele (Milutinović, 2018). DeFi omogućava korisnicima da koriste finansijske usluge poput pozajmljivanja, razmene i štednje bez posredstva banaka ili drugih centralizovanih institucija, koristeći decentralizovane aplikacije (*dApps*) zasnovane na blokčejnu (Jensen et al., 2021; Johnson, 2021).

Pored teorijskog pregleda ključnih koncepata blokčejn tehnologije i kriptovaluta, ovaj rad se fokusira na praktičan aspekt kroz prikaz kreiranja nove kriptovalute – ELAB. Na primeru *Binance Smart Chain* mreže, detaljno se opisuje implementacija pametnog ugovora, kreiranje tokena i način njihove distribucije. Takođe, istražuje se potencijal primene ovakvih rešenja u obrazovanju kroz uvođenje bodovnog sistema baziranog na blokčejnu.

U nastavku rada, prvo se analizira literatura i osnovni principi blokčejn tehnologije i kriptovaluta. Zatim se obrađuju decentralizovane finansije i njihova primena, nakon čega se prikazuje studijski primer kreiranja i distribucije kriptovalute ELAB. Na kraju, diskutuje se o mogućnostima buduće primene blokčejn tehnologije u obrazovanju i drugim sektorima.

BLOKČEJN TEHNOLOGIJA

Blokčejn je tehnologija koje se može definisati kao digitalna knjiga (eng. *ledger*) svih transakcija koje se dešavaju u okviru neke mreže računara, omogućavajući transparentnost, sigurnost i nepromenljivost upisanih podataka (Bogdanović et al., 2019; Nofer et al., 2017). Naziv blokčejn (eng. *blockchain*) dolazi iz načina na koji se transakcije čuvaju na mreži, a to je blok. Svaki pojedinačni blok koji se nalazi u lancu sadrži transakcije i prilikom svake nove transakcije koja se dogodi na blok lancu, ta transakcija se zapisuje u knjigu svakog učesnika. Baza podataka kojom upravlja više učesnika naziva se decentralizovana baza podataka, (eng. d*istributed ledger technology - DLT)* (Barney et al., n.d.) (Liu et al., 2020).

Blokčejn tehnologija pruža mogućnost rešavanja problema centralizovanih sistema koji omogućavaju korisnicima sa najviše moći da kontrolišu informacije koje su vidljive javnosti i na taj način ograničavaju sam sistem, dok ostali korisnici donose odluke isključivo na osnovu dostupnih informacija (Bogdanović et al., 2019). Ukoliko bi neko želeo

da ugrozi ili kompromituje blokčejn sistem, bilo bi neophodno da promeni svaki blok koji se nalazi u lancu, u svim distribuiranim verzijama lanca. Kako bi takav napad bio moguć, haker bi morao da ima kontoru nad 51% celokupnog lanca, što je veoma teško u razvijenim sistemima blokčejna (Ye et al., 2018).

Postoje dve glavne vrste blokčejn lanaca – privatni i javni (Bogdanović et al., 2019; Wegrzyn & Wang, 2021). Javni, ili blokčejn „bez dozvole," omogućava svima učešće u finansijskim transakcijama bez potrebe za identifikacijom (Guegan, 2017). U javnim blokčejnovima obično postoji "domaća" kriptovaluta, dok se konsenzus često postiže kroz ekonomske podsticaje i primenu „dokaza o radu" (eng. *Proof-of-Work - PoW*) (Monteviregen, 2022; Sriman et al., 2021).

S druge strane, privatni ili „dozvoljeni" blok lanci zahtevaju da se zna identitet učesnika (Guegan, 2017; Hao et al., 2018; Wegrzyn & Wang, 2021). U privatnom blokčejnu, interakcije između grupe učesnika koji dele zajednički cilj, ali nemaju puno poverenje jedni u druge (na primer, transakcije koje uključuju razmenu dobara, informacija ili sredstava) još uvek mogu da se obezbede. Postoji nekoliko primena blokčejn tehnologije kao što su: muzička industrija, zdravstvo, obrazovanje, sajber bezbednost i mnoge druge (Hao et al., 2018; Wegrzyn & Wang, 2021).

TOKENI I KRIPTOVALUTE

Tokeni na blokčejnu predstavljaju digitalne entitete koji omogućavaju vlasništvo, prenos i upravljanje različitim vrstama sredstava, prava ili vrednosti unutar decentralizovanih mreža (Bogdanović et al., 2019). Ovi tokeni funkcionišu na principima distribuirane knjige (DLT) i mogu biti korišćeni za širok spektar aplikacija, uključujući digitalne valute, vlasničke instrumente, pristupne ključeve i sistemske nagrade (Schwiderowski et al., n.d.).

Postoji nekoliko ključnih kategorija blokčejn tokena (Oliveira et al., 2018):

- Platni tokeni (*payment tokens*) se koriste kao digitalni novac i omogućavaju direktne peer-to-peer transakcije bez posrednika, pri čemu su Bitcoin i Ethereum najpoznatiji primeri.
- *Utility* tokeni služe za omogućavanje pristupa određenim uslugama ili funkcijama na blokčejn platformama
- *Asset* tokeni predstavljaju digitalizovane oblike stvarnih sredstava, poput akcija, nekretnina ili umetničkih dela. Ova kategorizacija pomaže u razumevanju različitih uloga tokena u digitalnoj ekonomiji i omogućava regulatornim telima da primene odgovarajuće pravne okvire.

Jedan od glavnih izazova u token ekonomiji jeste interoperabilnost između različitih blokčejn mreža, što može uticati na fleksibilnost korišćenja tokena i njihovu vrednost. Dok privatne blokčejn mreže omogućavaju veću kontrolu nad pravilima interakcije

i transakcija, javni blockchain sistemi donose veću transparentnost i decentralizaciju, ali i izazove u pogledu regulative i skalabilnosti (Sunyaev et al., 2021).

Platni tokeni mogu biti nativni ili tokenizovani (Oliveira et al., 2018; Schwiderowski et al., n.d.):

- Nativni tokeni su osnovni tokeni blokčejn mreže i služe kao njeno glavno sredstvo razmene i plaćanja. Oni su direktno povezani sa blokčejn mrežom na kojoj funkcionišu. *Bitcoin* (BTC) je prvi i najpoznatiji primer nativnog tokena, dizajniran isključivo kao digitalna valuta koja omogućava *peer-to-peer* transakcije bez potrebe za centralizovanim autoritetima. Slično tome, *Ether* (ETH), iako prvenstveno služi za pokretanje pametnih ugovora na *Ethereum* mreži, takođe se koristi kao platni token za pokrivanje troškova transakcija (*gas fee*).
- Tokenizovani platni tokeni su tokeni koji su kreirani na postojećim blokčejn mrežama koristeći standardizovane protokole kao što su ERC-20 (*Ethereum*) ili BEP-20 (*Binance Smart Chain*). Ovi tokeni nemaju sopstveni blokčejn, već koriste infrastrukturu postojećih mreža za izvršavanje transakcija. Primeri uključuju USDT (*Tether*) i USDC (*USD Coin*), koji su *StableCoin*-i vezani za vrednost tradicionalnih fiat valuta kako bi smanjili volatilnost.

Razvoj tokenizovanih ekosistema otvara mogućnost za potpuno nove poslovne modele, uključujući decentralizovano finansiranje (DeFi), gde tokeni omogućavaju korisnicima da pozajmljuju, ulažu i osiguravaju sredstva bez potrebe za tradicionalnim bankarskim institucijama. Takođe, rastuća primena *non-fungible* tokena (NFT) pokazuje kako blokčejn može transformisati umetničku i kreativnu industriju, omogućavajući stvaranje digitalnih dokaza o vlasništvu koji su nepromenljivi i proverljivi u blokčejn mreži (Schwiderowski et al., n.d.).

Kriptovalute

Kriptovalute su digitalni ili virtuelni oblici valuta koji koriste kriptografiju za osiguranje plaćanja i uklanjanje potrebe za posrednicima u transakcijama (Milutinović, 2018). Ove valute mogu se dobiti putem rudarenja (eng. *mining*) na blokčejn mreži ili kupovinom na kripto berzama i koriste različite metode šifrovanja, kao što su parovi javno-privatnih ključeva i heš (eng. *hash*) funkcije (Pernice & Scott, 2021). Iako se kriptovalute poput *Bitcoin* retko koriste za svakodnevne kupovine, stekle su popularnost kao finansijski instrumenti zbog svoje rastuće vrednosti i mogućnosti prenosa sredstava preko granica (Burniske & Tatar, 2018).

Infrastruktura blokčejna je zaslužna za *Bitcoin* revoluciju (Tapscott & Kaplan, 2019). *Bitcoin* je kriptovaluta koja obezbeđuje sigurnost i poverenje kroz programe za verifikaciju i validaciju transakcija (Lewis, 2018). Zahvaljujući nezavisnosti blokčejn mreže od bilo koje centralizovane institucije, *Bitcoin*-om ne mogu upravljati tradicionalni centralni sistemi plaćanja i bankarstva (Lewis, 2018; Pernice & Scott, 2021).

Vodeće blokčejn tehnologije velikih kriptovaluta i njihovih mreža, poput *Bitcoin*, *Ethereum* i Bajnensa (eng. *Binance)*, neprekidno rastu, a sa njihovim rastom blokovi se dodaju u lanac, što znatno povećava sigurnost evidencije (Burniske & Tatar, 2018). Kao kriptovaluta, *Bitcoin* koristi decentralizovane kriptografske alate i *peer-to-peer* sistem kako bi korisnicima omogućio transfer novca bez oslanjanja na centralizovane pouzdane ustanove poput platnih usluga ili banaka (Lewis, 2018; Nakamoto, n.d.). Sa druge strane, *Ethereum* kao platforma za pametne ugovore i njena osnovna kripto valuta Eter (eng. *Ether*), omogućava korisnicima ne samo transfer novca, već i razvoj i izvršavanje decentralizovanih aplikacija (*dApps*) bez oslanjanja na centralizovane posrednike poput tradicionalnih servera ili finansijskih institucija (Arslanian, 2022; Tikhomirov, 2018). Takođe, ekosistem blokčejn mreža - *Binance* i njegova kripto valuta *Binance Coin* (BNB) koristi decentralizovane i centralizovane infrastrukture kako bi omogućio transfer vrednosti, trgovinu i interakciju sa *Binance Smart Chain* mrežom, pružajući korisnicima opcije za transakcije, plaćanja i pokretanje decentralizovanih aplikacija, uz mogućnost korišćenja centralizovane *Binance* menjačnice za dodatnu likvidnost i usluge (Cernera et al., n.d.; Kaur, 2023; Nugroho & Setiawan, 2023).

U septembru 2024. godine tržište kriptovaluta je u fazi stabilizacije. Ukupan kapital koji se nalazi u kriptovalutama iznosi 2.2 triliona američkih dolara po sajtu https://coinmarketcap.com/.

Većina popularnih kriptovaluta ima sopstveni blokčejn i nativnu valutu, kao što su *Bitcoin*, *Ethereum, BNB, XRP* i *Solana*. Pored njih postoje i kriptovalute koje nazivamo *StableCoin*-ima, poput *Tether*-a i *USD Coin*-a. *StableCoin* je vrsta kriptovalute koja je obično vezana za određenu fiat valutu, kao što su dolar, evro ili jen (Sidorenko, 2019). Postoje i posebni primeri *StableCoin*-a povezani sa zlatom ili drugim kriptovalutama, mada su manje zastupljeni.

DECENTRALIZOVANE MENJAČNICE I DECENTRALIZOVANE FINANSIJE

Kripto menjačnice baziraju svoje poslovanje na posredstvu u kupovini i prodaji kriptovaluta i naplaćivanju provizije po transakciji (Brasse & Hyun, 2023; Johnson, 2021). Menjačnice koje imaju veći obim poslovanja nude i štednju, poput tradicionalnog bankarskog sistema. U ovakvom sistemu korisnici štednje dobijaju od banke proviziju na svoju štednju a sama provizija je najčešće veća nego kod tradicionalnih banki (Wembo, 2025).

Tržište kriptovaluta je veoma dinamično i podložno značajnim promenama, što je posledica njegove relativno kratke istorije. Međutim, novi zakoni i regulative smanjuju rizike i promene. Velike kripto menjačnice su u Sjedinjenim Američkim Državama pod nadzorom državnih agencija (Johnson, 2021).

Centralizovane menjačnice - *CEX* (eng. *Centralized exchange*) su organizacije koje koordinišu trgovinu kriptovalutama u većim razmerama a koriste poslovni model koji je nalik tradicionalnim menjačnicama (George, 2023). Nasuprot centralizovanim

menjačnicama postoje i decentralizovane kripto menjačnice - *DEX* (eng. *Decentralized exchange*), međutim one su ređe od ranije pomenutih centralizovanih koje i dalje čine oko 90% ukupnog broja kripto menjačnica (George, 2023).

Najveća menjačnica po obimu transakcija, oko dvadeset milijardi američkih dolara dnevno, je *Binance* (Brasse & Hyun, 2023). Menjačnica funkcioniše po modelu centralizovane menjačnice ali je pokrenula i svoj decentralizovani odsek . *Binance* poseduje sopstvenu kriptovalutu za svoj ekosistem poslovanja - *Binance coin* i blokčejn tehnologiju *Binance Smart Chain* (Kaur, 2023; Nugroho & Setiawan, 2023). Kreiranjem svog blokčejna, *Binance* se aktivno uključio u sferu decentralizovanih kripto menjačnica (Lehar & Parlour, 2021).

Binance coin inicijalno je zasnovan na *Etherium* blokčejnu, prateći standard *ERC-20* (*ERC-20 Token Standard*, n.d.), kasnije postavši izvorni token *Binance* lanca. Pokrenut je jula 2017. u seriji od dvesta miliona *BNB* tokena (Kaur, 2023).

Trenutno je *BNB* šesta najveća kriptovaluta po tržišnoj kapitalizaciji koja iznosi oko 91,7 milijardi dolara (*Cryptocurrency Prices, Charts And Market Capitalizations | CoinMarketCap*, n.d.). Uspeh koji se ogleda u tržišnoj kapitalizaciji kriptovaluta duguje razvoju *Binance* menjačnice.

Binance DEX je decentralizovana razmena koja nastoji da prenese ključne aspekte *Binance* platforme u decentralizovano okruženje, pružajući bezbednost i prednosti *DEX*-a (Asef et al., 2024). *Binance Chain* je osnova ove razmene, sa primarnim fokusom na brzo i efikasno upravljanje razmenom sredstava. Binance DEX omogućava primanje i slanje Binance Coin-a (BNB) između različitih adresa (Asef et al., 2024; Brasse & Hyun, 2023; Cernera et al., n.d.). BNB je pretvoren u lokalni novčić *Binance Chain* lanca, čime se povećava njegova upotreba za troškove i razmene (Kaur, 2023).

Decentralizovane finansije – *DeFi* (eng. *Decentralized finances*), decentralizovane finansije je pokret koji zastupa finansijske usluge zajmova i trgovanja bez posredstva centralizovanih subjekata (Jensen et al., 2021). Ovakve usluge se propagiraju preko decentralizovanih aplikacija - dApps, gde je većina zasnovana na platfomi *Ethereum*. DeFi se i ogleda u nizu finansijskih usluga poput bankarstva, obveznica, tržišta novca i osiguranja oponašajući tradicionalna finansijska poslovanja i tržišta (Jensen et al., 2021).

Glavne kategorije koje DeFi obuhvata su (Jensen et al., 2021):

1. *Decentralizovane menjačnice*
   Omogućavaju korisnicima razmenu kripto valute bez posredstva bilo koje centralizovane treće strane, kao i samostalno čuvanje svoje digitalne imovine. Ne zadržavajući sredstva na centralizovanim menjačnicama, korisnici izbegavaju potrebu da veruju u solventnost tih platformi.
2. *DeFi pozajmljivanje i zaduživanje*
   Ovaj vid zaduživanja daje korisnicima pravo polaganja sopstvene digitalne imovine kao zaloga, za koju oni potom mogu dobiti adekvatan zajam. Digitalna imovina korisnicima može poslužiti i kao sredstvo štednje, odnosno učešća na tržištu pozajmljivanja na osnovu kog korisnici mogu dobiti kamatu na sopstvenu štednju.

Ovakav sistem pozajmljivanja i zaduživanja u potpunosti eliminiše potrebe korisnika za proveru kreditnog rejtinga, odnosno kreditne sposobnosti, ili potrebe bankovnih računa .

3. *Decentralizovani StableCoin*
   Koncept koji rešava pitanje poverenja. *StableCoin* kreira se metodom prekomerne kolateralizacije, beleže se u decentralizovanim knjigama i njima upravljaju decentralizovani autonomni entiteti. Provere rezervi *StableCoin*-a su potpuno dostupne na uvid javnosti.

Uz navedene krucijalne faktore, prisutni su i mnogi drugi koji doprinose razvoju decentralizovanog sektora poput: plaćanja, upravljanja finansijama, osiguranjima ili fondovima, derivati i mnogi drugi faktori (CoinGecko et al., 2021; Lau et al., 2021).

Sektor decentralizovanih aplikacija i organizacija pokazuje trend rasta. Nakon poslednje recesije usledile su mere korekcije i stabilizacije celog DeFi tržišta koji trenutno ima kapitalizaciju izmerenu sa 100,6 milijardi američkih dolara (*Total DeFi Market Cap Chart — TradingView*, n.d.).

DeFi sektor doživljava kontinuirana unapređenja i stavlja akcenat na pristupačnost i lakoću kreiranja čime privlači znatan broj novih investitora. Među brojnim funkcionalnostima koje poseduje ovaj sektor izdvajaju se i (CoinGecko et al., 2021; Lau et al., 2021):

- Novčanik – ***Argent*** pravi drastično superiorno uključivanje kripto novčanika fokusiranog na korisnika, sa najsavremenijom bezbednošću, lokalnom integracijom sa DeFi decentralizovanim aplikacijama, kao što su *Compound* i drugi, kao i one koji ne zahtevaju *seed* ključeve.
- Učešće u DeFi stavkama – **Zapper** efikasno apstrahuje složene procese i korake koji su uključeni u upravljanje DeFi stavkama, aplikacijama i proizvodima. Pored toga, pruža korisnicima mogućnost da lako pristupe različitim budžetskim stavkama u okviru jedne platforme, čime značajno štedi vreme i napor.
- Prilagođeni napredak – **Gelato Finance** je predstavio mehanizam poznat kao reaktor za događaje u kriptovalutama. Ovaj alat omogućava korisnicima da definišu specifične aktivnosti koje će biti automatski izvršene kada se ispune određeni uslovi, kao što su "Kupite Ether kada cena dostigne 200 dolara" ili "Pošaljite kriptovalutu Alisi na njen rođendan" .
- Osiguranje - **Nexus Mutual** primer je mehanizama garancije i zaštite. Platforma omogućava korisnicima da zaštite svoja digitalna sredstva, funkcionišući na principu zajednice gde članovi mogu da ulažu u osiguranje i odlučuju o isplatama koji pokrivaju troškove mogućih incidenata.

Uzimajući u obzir ekspanziju ovog sektora, neophodne su potrebne regulative i lakši pristup korisnicima kako bi se ta ekspanzija nesmetano nastavila (Bogdanović et al., 2019; Brasse & Hyun, 2023; Johnson, 2021).

STUDIJSKI PRIMER - ELAB KRIPTOVALUTA

Studijski primer koji će se obrađivati u nastavku rada, pokazuje proces kreiranja kriptovalute. Prilikom kreiranja jedne kriptovalute potrebno je napisati, razviti i testirati pametni ugovor na blokčejn mreži. Svaka transakcija, pa i testiranje, zahteva korišćenje kriptovalute u određenom iznosu, ali za potrebe testiranja koristiti se test mreža i test tokeni koje svaka blokčejn mreža obezbeđuje (Bogdanović et al., 2019; Gururaj et al., 2020; Nofer et al., 2017). Način obezbeđivanja ovih test tokena se vrši pomoću česmi (eng. *faucet*) (*What Is a Crypto Faucet? | Coinbase*, n.d.).

Inicijalno, potrebno je kreirati digitalni novčanik - koji nam omogućava trgovinu i čuvanje kriptovaluta, ali i samo kreiranje jedne. Novčanik može biti softverskog ili hardverskog tipa i služi za čuvanje informacija o privatnim blokčejn ključevima vlasnika, za izvršavanje svih transakcija na nekoj blokčejn mreži, kao i čuvanje informacija o kriptovalutama vlasnika (Mackay, 2019). Za potrebe ovog primera korišćen je softverski kripto novčanik - *Metamask*.

Studijski primer je realizovan na *Binance Smart Chain TestNet* blokčejn mreži. Svaka velika blokčejn mreža, ima svoju test kopiju, koja dozvoljava testiranje decentralizovanih aplikacija bez potrebe trošenja realnih kripto sredstava. Migracija sa test mreže na aktivnu mrežu iziskuje svega par dodatnih koraka u standardizovanoj proceduri.

Binance Smart Chain mreža je bazirana na *Ethereum* blokčejnu pa se za samo kreiranje pametnog ugovora, odnosno kriptovalute koristi programski jezik *Solidity* (koinmilyoner, 2023).

Kreiranje pametnog ugovora prikazano je na ilustraciji broj 1.

```
contract ERC20 is Context, IERC20, IERC20Metadata {
    mapping(address => uint256) private _balances;
    mapping(address => mapping(address => uint256)) private _allowances;

    uint256 private _totalSupply;

    string private _name;
    string private _symbol;

    constructor(string memory name_, string memory symbol_) {
        _name = name_;
        _symbol = symbol_;
}
}
```

Ilustracija 1 Kreiranje pametnog ugovora

Navedeni segment koda kreira pametni ugovor ERC20 koji propisuje pravila pri kreiranju tokena. Mapa *_balances* prikazuje podatak o balansu svakog korisnika, odnosno koliko svaka adresa (korisnik) poseduje tokena. Mapa *_allowances* čuva informacije o tome koliko jedna adresa (korisnik) može da potroši tokena u ime druge adrese (korisnika). Promenljiva *_totalSupply* zadaje ukupnu količinu tokena emitovanih u sistemu.

Promenljive *_name* i *_symbol* čuvaju naziv i simbol tokena, što su informacije preko kojih identifikujemo token na tržištu.

Konstruktor se poziva prilikom objavljivanja ugovora na blokčejn mreži, prima dva parametra za identifikaciju tokena i inicijalizuje ih sa konkretnim vrednostima.

```
function balanceOf(address account) public view virtual override
returns (uint256) {
return _balances[account];
}
```

Ilustracija 2 Trenutno stanje na računu/nalogu - balans

Nakon kreiranja ugovora programiraju se funkcije kojima možemo obezbediti pojedine funkcionalnosti u sistemu. Na ilustraciji broj 2 prikazana je funkcija kojom možemo dobiti balans, odnosno stanje računa, jednog konkretnog korisnika.

```
function transfer(address to, uint256 amount) public virtual override
returns (bool) {
address owner = _msgSender();
_transfer(owner, to, amount);
return true;
```

Ilustracija 3 Prenos sredstava

Ilustracija broj 3 predstavlja funkciju kojom omogućavamo da određena adresa (*owner*) pošalje nekoj drugoj adresi (*to*), određeni iznos (*amount*) kriptovalute. Uslov za uredno izvršenje ove funkcije je nenegativan iznos kriptovalute za slanje.

```
function _transfer(
      address from,
      address to,
      uint256 amount
  ) internal virtual {
      require(from != address(0), "ERC20: transfer from the zero address");
      require(to != address(0), "ERC20: transfer to the zero address");

      _beforeTokenTransfer(from, to, amount);

      uint256 fromBalance = _balances[from];
      require(fromBalance >= amount, "ERC20: transfer amount exceeds balance");
      unchecked {
          _balances[from] = fromBalance - amount;
      }
      _balances[to] += amount;
      emit Transfer(from, to, amount);

      _afterTokenTransfer(from, to, amount);
  }
```

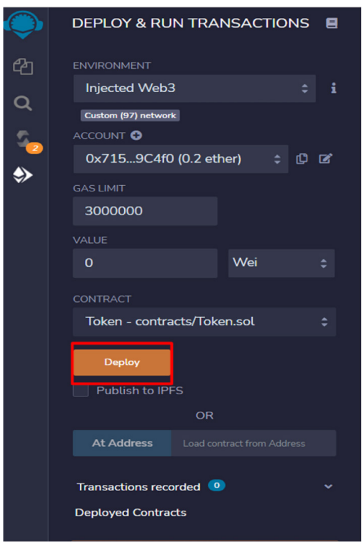
Ilustracija 4 Implementacija funkcije prenosa sredstava

Funkcija *_transfer* prikazana na ilustraciji br 4 sadrži logiku iza prenosa sredstava sa jedne na drugu adresu. Funkcija proverava slanje sa i na nultu adresu koje nije omogućeno jer može da uzrokuje gubitkom sredstava i pokreće *_beforeTokenTransfer* funkciju koja pre samog transfera u sebi sadrži delove koda za validaciju i praćenje transakcije. Funkcija potom proverava da li pošiljalac ima dovoljno tokena, nakon čega stanje računa pošiljaoca za broj tokena koji je namenjen za transfer i za isti broj povećava stanje računa primaoca. Na kraju funkcija poziva i funkciju *_afterTokenTransfer* u kojoj se takođe može sadržati logika za praćenje transakcije ili eventualnu statistiku transakcija.

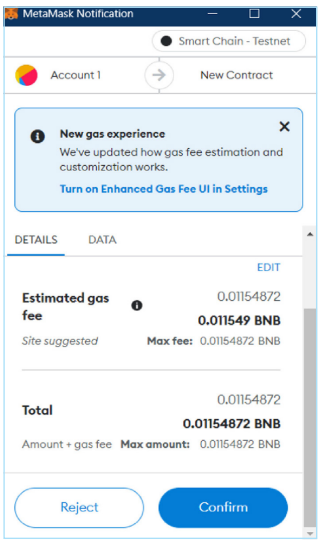
```
contract Token is ERC20 {

constructor () public ERC20("ELAB", "ELAB") {
    _mint(msg.sender, 1000000000 * (10 ** uint256(decimals())));
}

}
```

Ilustracija 5 ERC20 ugovor

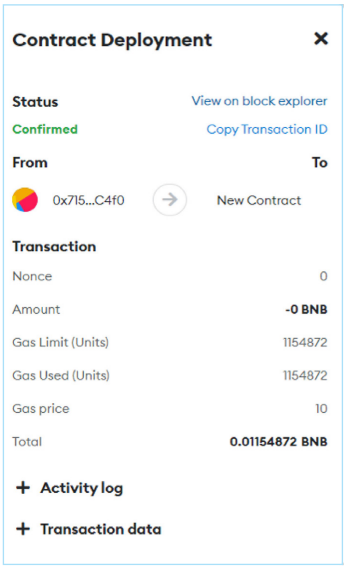
Prikaz konkretne instance ERC20 ugovora kojom se kreira Elab kriptovaluta sa emisijom od milijardu jedinica, može se videti na ilustraciji br 5. Sa završenom fazom kodiranja potrebno je odraditi *deploy*, odnosno puštanje, novokreirane kriptovalute i time je staviti u promet (ilustracija 6). Za kreiranje i puštanje kriptovalute potrebno je platiti naknade na blokčejn mreži (ilustracija 7.)



Ilustracija 6
Deploy kriptovalute



Ilustracija 7 Naknade za kreiranje i puštanje kriptovalute



Ilustracija 8 Uspešno puštanje pametnog ugovora

Nakon uspešno plaćenih naknada dobijamo poruku o uspešnom puštanju našeg pametnog ugovora (ilustracija 8).

DISKUSIJA

Proces kreiranja kriptovalute ELAB u okviru ovog istraživanja pokazuje kako blockchain tehnologija može omogućiti razvoj prilagođenih digitalnih tokena sa specifičnim funkcionalnostima. Korišćenje pametnih ugovora na Binance Smart Chain mreži omogućava efikasno i transparentno upravljanje distribucijom tokena, dok digitalni novčanici poput Metamaska pružaju jednostavan način za njihovo čuvanje i korišćenje. Ovaj proces naglašava kako kreiranje kriptovalute nije rezervisano samo za globalne finansijske institucije, već može biti primenjeno i u specijalizovanim sektorima poput obrazovanja, finansijskih instrumenata i digitalnih identiteta.

Distribucija kriptovalute se bazira na jednostavnom principu, uzimajući u obzir da se na početnu adresu inicijalizuje određen broj kreiranih ELAB kriptovaluta. Sve što je potrebno za distribuciju kriptovalute su adrese na koje je potrebno poslati određene iznose iste.

Pitanje potencijalne upotrebe ELAB tokena ostaje otvoreno za dalju diskusiju. Jedan od predloženih scenarija primene je u obrazovnom sistemu, gde bi tokeni mogli služiti kao alat za gejmifikaciju nastavnog procesa. Studenti bi mogli koristiti ELAB kriptovalutu kao sistem nagrađivanja za akademska postignuća ili kao način validacije učešća u kursevima i projektima. Ovakav model bi mogao unaprediti angažovanost studenata i povećati transparentnost ocenjivanja i sertifikacije znanja.

Međutim, postavlja se pitanje daljeg razvoja i integracije takvih sistema. Da li bi ovakvi tokeni mogli imati vrednost izvan internog ekosistema i da li bi ih regulatorni okviri prepoznali kao legitimna sredstva razmene? Takođe, kako obezbediti dugoročnu održivost tokena, sprečiti spekulacije i potencijalne regulatorne prepreke? Dalja istraživanja su potrebna kako bi se testirala stabilnost, prihvaćenost i sigurnost ovakvih modela u realnim primenama.

ZAKLJUČAK

Ovaj rad je istražio osnovne koncepte blokčejn tehnologije, kriptovaluta i decentralizovanih finansija, s posebnim fokusom na proces kreiranja i distribucije prilagođenih tokena. Kroz detaljnu analizu literature i studijski primer ELAB kriptovalute, rad je demonstrirao praktičnu primenu pametnih ugovora i decentralizovanih tehnologija u razvoju digitalnih sredstava.

Glavni doprinos rada leži u povezivanju teorijskih osnova sa praktičnim eksperimentom kreiranja kriptovalute, čime se pruža uvid u mogućnosti koje blokčejn nudi izvan tradicionalnih finansijskih tokova. Studijski primer ukazuje na potencijal primene tokena u obrazovanju, omogućavajući veću transparentnost i efikasnost ocenjivanja kroz decentralizovane sisteme nagrađivanja.

Postignuti rezultati otvaraju niz novih pitanja i pravaca za buduće istraživanje. Dalji rad može uključiti analizu regulatornih aspekata kreiranja tokena, testiranje modela tokenizacije u različitim sektorima i istraživanje dugoročne održivosti ovakvih sistema. Blokčejn tehnologija nastavlja da se razvija, pružajući nove mogućnosti za digitalizaciju finansijskih i nefinansijskih resursa, a ovakvi eksperimenti doprinose boljem razumevanju i adaptaciji ovog inovativnog pristupa u različitim domenima.

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Dragana Đorđević[1]

STRUČNI RAD
UDK 657.1:336.11

DOI: 10.46793/Rev25109.133DJ
Primljen: 03.03.2025.
Prihvaćen: 25.03.2025.
Objavljen: 15.04.2025.

Finansijsko izveštavanje javnog sektora odabranih zemalja u razvoju

Rezime: *Ovaj rad analizira kvalitet finansijskog izveštavanja u javnom sektoru zemalja u razvoju, ističući njegovu ulogu u osiguravanju transparentnosti, odgovornosti i efikasnog upravljanja javnim resursima. S obzirom na specifične ekonomske i institucionalne izazove s kojima se ove zemlje suočavaju, istraživanje se fokusira na uporednu analizu regulatornih okvira, računovodstvenih praksi i stepena usklađenosti sa međunarodnim standardima finansijskog izveštavanja. Analiza pokazuje da slaba usklađenost sa međunarodnim standardima, nedostatak kapaciteta za sprovođenje reformi i ograničena dostupnost tačnih i pravovremenih podataka mogu otežati upravljanje javnim sredstvima i smanjiti poverenje javnosti. Uočljivo je da unapređenje finansijskog izveštavanja u javnom sektoru zahteva sistemske reforme, bolju primenu računovodstvenih standarda i jačanje nadzornih institucija, što bi moglo doprineti povećanju fiskalne discipline i privlačenju investicija.*

Ključne reči: *finansijsko izveštavanje, javni sektor, zemlje u razvoju, transparentnost, međunarodni standardi*

[1] Ekonomski fakultet u Subotici, Univerzitet u Novom Sadu, Srbija.
E-mail: dragana.djordjevic@ef.uns.ac.rs

UVOD

Trend obezbeđivanja široke lepeze javnih usluga u razvijenim zemljama započeo je u 19. veku, prvenstveno kroz razvoj opštinskih sektora za pružanje osnovnih komunalnih usluga, poput obezbeđivanja vode i gasa (5). Kasnije su se nadležnosti državnih institucija proširile i na oblasti zdravstva i distribucije električne energije. Dok u mnogim razvijenim državama ove usluge i dalje obezbeđuju lokalne ili nacionalne vlade, izuzetak predstavljaju Sjedinjene Američke Države i Velika Britanija, gde je značajna uloga u pružanju javnih usluga dodeljena privatnom sektoru. S druge strane, u zemljama u razvoju javne usluge su manje zastupljene nego u razvijenim ekonomijama (3).

Svaka država, u skladu sa potrebama svojih građana i zvanično usvojenim politikama, određuje delatnosti koje potpadaju pod javni sektor (17). Ove delatnosti obuhvataju:

1. Usluge neophodne svim građanima (zdravstvo, obrazovanje, telekomunikacije itd.);
2. Usluge koje su previše skupe ili infrastrukturno zahtevne za individualno sprovođenje (izgradnja i održavanje puteva, distribucija i snabdevanje vodom i električnom energijom itd.).

Najčešće delatnosti od javnog interesa uključuju elektronske komunikacije, rudarstvo i energetiku, nuklearne objekte, izdavanje službenih glasila i knjiga, proizvodnju naoružanja i vojne opreme, kao i zaštitu, razvoj i promociju prirodnih resursa, poput voda, puteva, plovnih reka, jezera, banja i zaštićenih područja.

Javne usluge mogu posedovati određene karakteristike javnog dobra (s obzirom na njihovu nekonkurentnost i neisključivost), ali se u najvećem broju slučajeva odnose na uslužna dobra koja su nedovoljno zastupljena na tržištu. U savremenim tržišnim ekonomijama ne postoji tržište savršene konkurencije u kojem javna uprava funkcioniše, već su u pitanju pretežno oligopolistički i monopolistički oblici tržišta. To je rezultat specifičnih usluga koje javni sektor pruža, a koje drugi ekonomski subjekti ne bi mogli da obezbede pod tržišnim uslovima (8).

Sve javne institucije i organizacije, kao i preduzeća pod državnom kontrolom, obavezne su da sastavljaju finansijske izveštaje o svom poslovanju. Finansijsko izveštavanje predstavlja ključni segment poslovanja organizacija u javnom sektoru, budući da osigurava stabilnu i pouzdanu komunikaciju sa eksternim i internim zainteresovanim stranama. Finansijski izveštaji pružaju uvid u transakcije između institucija i njihovog okruženja, omogućavajući efikasno organizovanje poslovanja i donošenje ispravnih odluka (14).

Prema Konceptualnom okviru za finansijsko izveštavanje (15), osnovni cilj finansijskog izveštavanja jeste istinito i objektivno prikazivanje finansijske pozicije, rezultata poslovanja i promena u finansijskom položaju organizacija. Ukoliko finansijski izveštaji u potpunosti ispunjavaju ove kriterijume, može se smatrati da su kvalitetni. S obzirom na svoju primarnu funkciju, finansijski izveštaji su pre svega namenjeni eksternim korisnicima (investitorima, kreditorima, kupcima, državnim organima, društvenoj zajednici itd.), ali istovremeno služe i kao pouzdana osnova za menadžment, omogućavajući analizu poslovanja i donošenje strateških odluka (25).

PODELA ZEMALJA NA RAZVIJENE ZEMLJE I ZEMLJE U RAZVOJU

U savremenom svetu postoje značajne razlike u ekonomskoj razvijenosti između zemalja sa visokim dohotkom (razvijene zemlje) i zemalja sa niskim dohotkom (zemlje u razvoju). Ove razlike postaju sve izraženije, pri čemu se razvijene zemlje sve više bogate, dok zemlje u razvoju često stagniraju ili postepeno siromaše.

Trend sve većeg ekonomskog dispariteta može se posmatrati kroz fenomen koji se često naziva "efekat grudve snega" (26). Ovaj efekat podrazumeva da bogatije zemlje poseduju kapital koji koriste za dalji ekonomski rast, čime stvaraju još veći kapital. Ovaj proces se može objasniti kroz akumulaciju kapitala, bilo u materijalnom obliku (kao što su novac, prirodni resursi i sirovine), ili u nematerijalnom obliku (kao što su ljudski kapital, intelektualno vlasništvo, znanje, veštine i sposobnosti). Ovaj ciklus uvećanja kapitala često vodi do daljeg pogoršanja ekonomskih razlika između razvijenih i zemalja u razvoju.

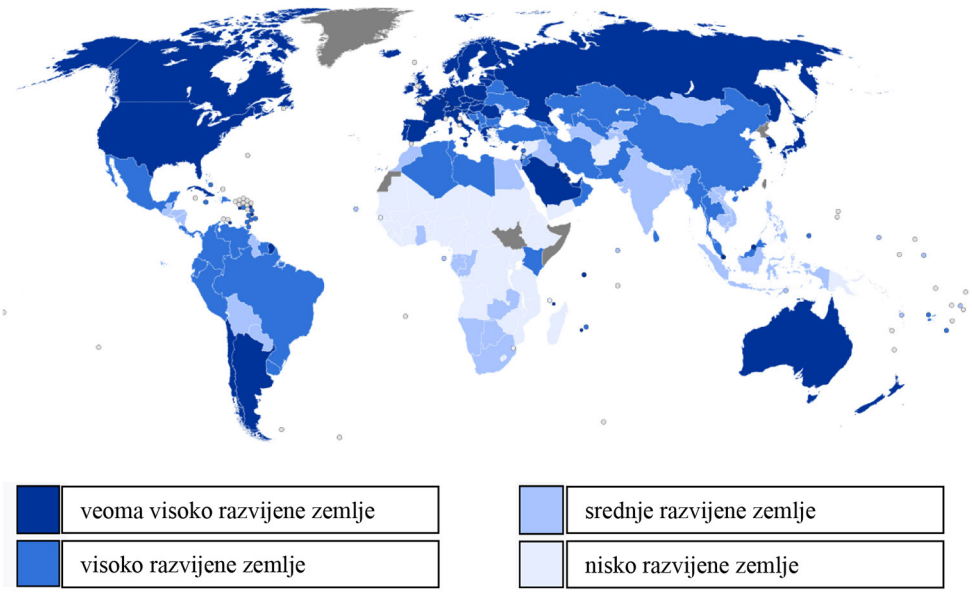
Klasifikacija zemalja prema stepenu ekonomske razvijenosti najčešće se vrši na osnovu nekoliko ključnih kriterijuma. Prema opštoj praksi, zemlje se mogu svrstati u tri glavne kategorije (29):

1. **Razvijene zemlje** – Zemlje sa visokom ekonomskom razvijenosti, stabilnim institucijama i visokim životnim standardom. Ove zemlje obično imaju pristup savremenim tehnologijama, stabilne ekonomske sisteme i razvijen sektor usluga.
2. **Zemlje u razvoju** – Zemlje koje pokazuju znakove napretka, ali se još uvek suočavaju sa izazovima u pogledu ekonomske stabilnosti, društvene jednakosti i infrastrukturnog razvoja. Često su u fazi industrijalizacije i modernizacije, ali i dalje imaju velike ekonomske i socijalne razlike.
3. **Nerazvijene zemlje** – Zemlje sa niskim nivoom industrijalizacije, visokom stopom siromaštva i niskim nivoom ekonomske aktivnosti. Ove zemlje se suočavaju sa velikim izazovima u pogledu obrazovanja, zdravstva i osnovnih infrastrukturnih resursa.

Za precizno određivanje statusa jedne zemlje, u obzir se uzimaju različiti indikatori, kao što su bruto domaći proizvod po glavi stanovnika (BDP per capita), indeks ljudskog razvoja (HDI), stopa nezaposlenosti i prosečna mesečna zarada (11).

U savremenom svetu, ključnu ulogu u smanjenju razlika između razvijenih i zemalja u razvoju ima ulaganje u ljudski kapital i obrazovanje. Obrazovani radnici i razvijeni istraživački kapaciteti omogućavaju zemljama da se uključe u globalnu ekonomiju na konkurentan način, stvarajući osnovu za dugoročni ekonomski rast.

Na slici 1 prikazane su zemlje sveta prema indeksu ljudskog razvoja. (30)



Slika 1: Prikaz zemalja sveta prema indeksu ljudskog razvoja (HDI)
Izvor:UN Human Development Report (29)

FINANSIJSKO IZVEŠTAVANJE U JAVNOM SEKTORU U ZEMLJAMA U RAZVOJU

Zemlje koje se često označavaju kao „zemlje trećeg sveta" ili, prema terminologiji Ujedinjenih nacija, kao zemlje u razvoju, čine značajnu grupu sa niskim ili srednjim nacionalnim dohotkom po glavi stanovnika. Ove zemlje karakteriše relativno nerazvijena privredna struktura, kao i mali udeo u globalnoj proizvodnji i trgovini (29).

Važno je naglasiti da se ova grupa zemalja odlikuje velikom heterogenošću, jer se države unutar nje značajno razlikuju u pogledu svojih ekonomskih karakteristika. Kao rezultat toga, ne postoji jedinstvena definicija koja bi obuhvatila sve zemlje u razvoju. Takođe, zemlje iz ove kategorije mogu prelaziti u višu grupu u skladu sa postignutim stepenom ekonomskog razvoja. Na primer, neke bivše zemlje u razvoju, kao što su četiri „Azijska tigra" (Singapur, Tajvan, Hong Kong i Južna Koreja), danas se svrstavaju među razvijene zemlje (32).

Prema određenim klasifikacijama, u grupu zemalja u razvoju spadaju i „zemlje u tranziciji", koje transformišu svoj ekonomski sistem sa centralno-planskog na tržišno-kapitalistički model. Iako se najuspešnije od njih, poput Poljske, Češke, Slovačke, Mađarske i Slovenije, danas smatraju razvijenim zemljama, mnoge druge evropske zemlje u tranziciji, kao što su Rusija, Belorusija, Ukrajina, Estonija, Letonija, Litvanija, Rumunija, Bugarska, Hrvatska, Bosna i Hercegovina, Crna Gora, Srbija, Makedonija, Albanija i Moldavija, još uvek spadaju u kategoriju zemalja u razvoju (6).

Zemlje u razvoju suočavaju se sa brojnim izazovima u pogledu implementacije efikasnog finansijskog izveštavanja u javnom sektoru. Za razliku od razvijenih zemalja, mnoge od ovih zemalja nemaju odgovarajuću infrastrukturu za kvalitetno prikupljanje i analizu podataka, što otežava transparentnost i odgovornost u upravljanju javnim resursima. U tom kontekstu, usmeravanje na poboljšanje sistema finansijskog izveštavanja može doprineti boljoj fiskalnoj disciplini, jačanju poverenja investitora i građana, te omogućiti efikasniju upotrebu državnih sredstava. Pravilno finansijsko izveštavanje takođe može olakšati međunarodnu saradnju i privući strane investicije, što je ključno za ekonomski rast i razvoj (26).

Ovaj rad analizira javni sektor u Srbiji, Bosni i Hercegovini, Rumuniji i Severnoj Makedoniji, kao primerima zemalja u razvoju u Evropi. Njihov izbor zasnovan je na zajedničkim karakteristikama, uključujući tranziciju iz socijalističkog sistema, slične ekonomske izazove, reforme javne uprave i procese evropskih integracija. Sve četiri zemlje suočavaju se sa problemima kao što su korupcija, neefikasnost birokratije i finansijska održivost javnog sektora, što ih čini relevantnim za uporednu analizu. Rumunija, iako članica EU, još uvek deli određene strukturne izazove sa ostalim analiziranim zemljama, dok su Srbija, Bosna i Hercegovina i Severna Makedonija u različitim fazama pristupnih pregovora, što dodatno oblikuje njihove reforme. Ograničenje na ove četiri zemlje omogućava fokusiraniju analizu specifičnih problema i reformskih izazova u javnom sektoru regiona.

Računovodstvo i finansijsko izveštavanje u javnom sektoru u Rumuniji

Rumunski sistem javnih finansija karakteriše visoka centralizacija, pri čemu većina javnih potreba zavisi od finansiranja iz državnog budžeta, koji čini dominantan deo ukupne javne potrošnje. Iako su uloženi značajni napori ka decentralizaciji sistema lokalnog finansiranja, lokalne samouprave u Rumuniji i dalje ostaju zavisne od transfera centralne vlasti, budući da sopstveni prihodi mogu pokriti samo manji deo njihovih finansijskih potreba. Lokalne samouprave upravljaju sa četiri ključne kategorije prihoda (31)(24):

1. **Tekućim fiskalnim prihodima**, koji uključuju poreze na imovinu, zemljište i transportna vozila;
2. **Tekućim nefiskalnim prihodima**, kao što su transferi i grantovi iz državnog budžeta;
3. **Kapitalnim prihodima**, koji nastaju od lokalne imovine;
4. **Prihodima iz posebnih izvora**, uključujući poreze i neiskorišćene rashode iz prethodnih godina.

Rumunija se može pohvaliti snažnim pravnim okvirom za formulisanje budžeta, uspostavljenim Zakonom o javnim finansijama, koji je nedavno dopunjen Zakonom o fiskalnoj odgovornosti (7)(4).

Budžetski procesi u zemlji obuhvataju faze formulacije budžeta, njegovog usvajanja, izvršenja i nadzora. Ovi procesi se primenjuju na centralni budžet kao i na lokalne

budžete, pri čemu postoje značajne razlike u načinu primene budžetskih postupaka, koje proističu iz razlika u nivou javnih vlasti, veličini i strukturi njihovih budžeta.

U Rumuniji je propisano obavezno godišnje finansijsko izveštavanje, koje se reguliše kroz oblik, sadržaj i rokove za podnošenje finansijskih izveštaja. Komplet finansijskih izveštaja uključuje (31):

1. **Bilans stanja**, koji prikazuje imovinu, obaveze i finansijsko stanje na datum 31. decembra tekuće i prethodne godine;
2. **Račun prihoda i rashoda**, koji osvetljava ekonomski učinak na datum 31. decembra tekuće i prethodne godine;
3. **Izveštaj o tokovima gotovine**, koji prikazuje iznose prikupljene i plaćene tokom godine, kao i konačnu poziciju trezora;
4. **Izveštaj o promenama u kapitalu**, koji detaljno opisuje povećanja i smanjenja u svakoj stavci računa kapitala tokom godine;
5. **Izveštaj o izvršenju budžeta institucije**, koji obuhvata detalje o realizaciji budžetskih operacija.

Aneks finansijskih izveštaja ima funkciju dopunjavanja i komentarisanja informacija sadržanih u prethodnim izveštajima, pružajući dodatne informacije koje su u skladu sa međunarodno prihvaćenom računovodstvenom praksom, ukoliko su relevantne za delatnost javnih institucija. Takođe, ista uredba se odnosi na izveštaje o izvršenju budžeta, koji se sastoje od (31):

1. **Izveštaja o realizaciji budžeta**, koji utvrđuje sve budžetske operacije za godinu u pogledu prihoda i rashoda;
2. **Aneksa obračuna realizacije budžeta**, koji dopunjava i komentariše informacije iz pomenutog izveštaja.

Računovodstvo i finansijsko izveštavanje u javnom sektoru u Republici Severnoj Makedoniji

Javni sektor Republike Severne Makedonije čine sve javne institucije koje osniva centralna ili lokalna vlast, a koje obavljaju administrativne i javne funkcije ili realizuju javne delatnosti, a finansiraju se iz državnih ili lokalnih budžeta. Državni budžet obuhvata centralni budžet i budžete specijalizovanih fondova. Centralni budžet se odnosi na budžetske korisnike centralne vlade i obuhvata glavni budžet, budžet donacija, budžet za kredite i budžet za samofinansirajuće aktivnosti. U okviru državnog budžeta nalaze se i fondovi kao što su Fond penzionog osiguranja, Fond zdravstvenog osiguranja i Fond Zavoda za zapošljavanje. Lokalne samouprave raspolažu sopstvenim budžetima, čija struktura finansiranja je slična onoj u centralnom budžetu (28).

U kontekstu odgovornosti za izradu godišnjih finansijskih izveštaja, budžetski korisnici i korisnici fondova dužni su da pripreme sledeće osnovne finansijske izveštaje:

1. Bilans stanja,
2. Bilans uspeha (Izveštaj o prihodima i rashodima), i
3. Konsolidovani izveštaj – koji pripremaju budžetski korisnici koji posluju preko drugih korisnika i koji predstavlja sveobuhvatan pregled prihoda i rashoda tih korisnika (23).

Pored osnovnih finansijskih izveštaja, godišnji račun budžeta Republike Severne Makedonije uključuje sledeće prateće izveštaje (31):

1. Izveštaj o naplaćenim prihodima i isplaćenim rashodima na svim računima budžeta Republike, upoređen sa planiranim budžetskim prihodima i odobrenom potrošnjom, uz objašnjenje varijansi, i
2. Detaljan pregled potrošnje rezervi i izvršenih garancija za kredite podignute tokom fiskalne godine (16).

Svi finansijski tokovi korisnika centralne vlade i lokalnih samouprava evidentiraju se u jedinstvenom novčanom računu trezora i u knjigama trezora. Iako centralni budžet i odgovarajući godišnji izveštaj odobrava parlament, opštinske vlasti usvajaju lokalni budžet i prateći godišnji izveštaj. Interakcije između različitih nivoa vlasti obuhvataju:

1. Dostavljanje budžeta lokalnih samouprava Ministarstvu finansija tokom procesa formulisanja godišnjeg budžeta,
2. Ograničenje u vezi sa podizanjem kredita ili drugih dugova od strane opština bez prethodnog odobrenja Ministarstva finansija, i
3. Odobrenje godišnjih izveštaja lokalnih budžeta kao pratećih dokumenata (21).

Računovodstvo i finansijsko izveštavanje u javnom sektoru u Bosni i Hercegovini

Zbog složene organizacije Bosne i Hercegovine, finansiranje različitih nivoa vlasti je takođe kompleksno. Finansiranje centralne države, entiteta i jedinica lokalne samouprave uređeno je sledećim zakonima: Zakonom o trezoru institucija BiH, Zakonom o budžetima institucija Federacije BiH, kao i drugim povezanim zakonima. Prema Ustavu Bosne i Hercegovine, Federacija BiH obezbeđuje 2/3, a Republika Srpska 1/3 prihoda za budžet institucija, koji se mesečno prenose sa entiteta na račun otvoren u Centralnoj banci (12).

Složena teritorijalna organizacija BiH, koja uključuje dva entiteta (Federaciju BiH i Republiku Srpsku), kao i kantone i opštine, dodeljuje značajne odgovornosti svim nivoima vlasti u pogledu prikupljanja prihoda i finansiranja javnih funkcija. Institucije Bosne i Hercegovine finansiraju se isključivo iz budžeta na nivou države, dok je finansiranje drugih nivoa vlasti regulisano posebnim zakonima. Na primer, Zakon o raspodeli javnih prihoda u Federaciji BiH definiše način raspodele javnih prihoda sa jedinstvenog računa Federacije BiH na kantone i jedinice lokalne samouprave (1).

U Federaciji Bosne i Hercegovine, delokrug javnog sektora regulisan je Zakonom o budžetima institucija. Ovaj zakon obuhvata budžet Federacije BiH, budžete kantona,

budžete jedinica lokalne samouprave, kao i vanbudžetske korisnike. Vanbudžetski korisnici uključuju privredna društva i organizacije koje pružaju javne usluge, osnovane posebnim zakonima (27).

Republika Srpska ima sličan zakonski okvir, ali sa specifičnostima koje se odnose na njene institucionalne okvire i fiskalnu autonomiju. Zakon o budžetima institucija Republike Srpske definiše budžet Republike Srpske, budžete opština, kao i specifične regulative za vanbudžetske korisnike. Kao i u Federaciji BiH, institucije Republike Srpske podnose tromesečne, polugodišnje i godišnje izveštaje, koji se dostavljaju Vladi Republike Srpske, dok opštine i gradovi dostavljaju kvartalne izveštaje. Poseban aspekt zakonodavstva Republike Srpske je i Zakon o javnim nabavkama, koji je specifičan za ovaj entitet i utiče na način finansijskog izveštavanja (2)(12).

Brčko distrikt ima poseban status, jer je to jedinica koja nije deo ni Federacije BiH ni Republike Srpske. Za Brčko distrikt, finansijsko izveštavanje uređeno je Zakonom o budžetu Brčko distrikta, koji reguliše finansije i budžetske obaveze ovog distrikta. Brčko distrikt ima svoj trezor i posebne zakone koji definišu budžet distrikta, a izveštaji o izvršenju budžeta se podnose Skupštini Brčko distrikta. U ovoj oblasti, Brčko distrikt ima mnogo veću autonomiju u pogledu finansijskog upravljanja u odnosu na entitete, ali je i dalje dužan da poštuje opšte propise koji se odnose na javno finansijsko izveštavanje na nivou BiH (1)(27).

Finansijski izveštaji na svim nivoima vlasti uključuju izveštaje o stanju i strukturi imovine, obaveza, prihoda, rashoda i tokova gotovine. U pogledu izveštavanja o izvršenju budžeta, zakonom su propisani sledeći koraci:

1. Ministarstvo finansija dostavlja tromesečne, polugodišnje i devetomesečne finansijske izveštaje Vladi,
2. Opštinske i gradske službe za finansije podnose kvartalne izveštaje opštinskim i gradskim većima, kao i kantonalnim ministarstvima finansija,
3. Vanbudžetski fondovi dostavljaju kvartalne izveštaje o izvršenju finansijskih planova nadležnim ministarstvima i Federalnom ministarstvu finansija,
4. Kantonalna ministarstva finansija dostavljaju konsolidovane tromesečne izveštaje o izvršenju budžeta kantona, opština i gradova Ministarstvu finansija,
5. Ministarstvo finansija podnosi Vladi izveštaj o izvršenju budžeta za prethodnu godinu, koji se zatim dostavlja Skupštini na usvajanje u roku od šest meseci od kraja fiskalne godine (2).

Godišnji izveštaji Federacije BiH, Republike Srpske i Brčko distrikta uključuju sledeće osnovne izveštaje:

1. Račun prihoda i rashoda,
2. Bilans stanja,
3. Izveštaj o tokovima gotovine,
4. Izveštaj o kapitalnim rashodima i finansiranju.

Računovodstvo i finansijsko izveštavanje u javnom sektoru u Srbiji

Zakonom o finansiranju jedinica lokalne samouprave (18) uređuju se finansijska pitanja državnih organa okruga, opština i gradova. Ovim zakonom propisano je da prihodi lokalne samouprave pripadaju izvorima na njenoj teritoriji prema različitim osnovama. Izvorni prihodi ostvareni na teritoriji lokalne samouprave, u skladu sa Zakonom, razvrstavaju se u kategorije kao što su porezi na imovinu (izuzev poreza na prenos apsolutnih prava i poreza na nasleđe i poklone), lokalne administrativne takse, lokalne opštinske takse, naknade za korišćenje javnih dobara, koncesione naknade, prihodi od zakupa, prihodi od prodaje usluga korisnicima budžeta lokalne samouprave, prihodi od novčanih kazni izrečenih u prekršajnom postupku za prekršaje definisane aktima skupštine opštine, prihodi od kamata na sredstva iz budžeta lokalne samouprave, donacije lokalnim samoupravama, kao i prihodi od doprinosa (Zakon o finansiranju jedinica lokalne i područne (regionalne) samouprave). Donošenje Zakona o izmenama i dopunama Zakona o finansijama lokalne samouprave predstavlja značajan podsticaj u procesu decentralizacije javnih finansija (13).

Delokrug javnog sektora u Republici Srbiji prvenstveno je definisan Zakonom o budžetskom sistemu (19). Javni sektor obuhvata javna i nefinansijska preduzeća pod kontrolom države koja obavljaju komercijalne aktivnosti (javna preduzeća). Opšta država uključuje budžet Republike Srbije, budžete jedinica lokalne samouprave, vanbudžetske fondove, fondove socijalnog osiguranja na svim nivoima vlasti, kao i neprofitne i netržišne institucije koje država finansira i kontroliše. Prema Zakonu o javnim preduzećima, javna preduzeća se osnivaju radi obavljanja delatnosti od opšteg interesa, a njihovi osnivači mogu biti Republika Srbija, autonomne pokrajine ili jedinice lokalne samouprave. Delatnosti od javnog interesa obuhvataju oblasti poput elektronskih komunikacija, rudarstva i energetike, nuklearnih objekata, izdavanja službenih glasila i knjiga, naoružanja i vojne opreme, kao i zaštite, razvoja i promocije dobara od opšteg interesa, uključujući vodne resurse, puteve, plovne reke, jezera, banje i zaštićena područja (9).

Budžet predstavlja ključni finansijski instrument centralnih i lokalnih vlasti. Njime se projektuju prihodi, primanja, rashodi i izdaci, usklađeni sa prioritetima, ciljevima i zadacima državnih i lokalnih institucija(14)(10). Budžetsko računovodstvo u Republici Srbiji obuhvata vođenje knjigovodstva, pripremu, podnošenje i objavljivanje finansijskih izveštaja budžetskih korisnika i organizacija obaveznog socijalnog osiguranja. Računovodstvo budžeta zasniva se na gotovinskoj osnovi, što podrazumeva priznavanje transakcija i poslovnih događaja u trenutku prijema ili uplate novčanih sredstava. Finansijski rezultat određuje se na osnovu promene stanja gotovine i gotovinskih ekvivalenata, pri čemu se bilans novčanih sredstava koristi kao primarni pokazatelj rezultata. Ipak, za potrebe internog izveštavanja, budžetski korisnici mogu primenjivati obračunsku osnovu računovodstva. Finansijski izveštaji koji se sastavljaju na gotovinskoj osnovi uključuju:

1) Izveštaj o tokovima gotovine,
2) Izveštaj o kapitalnim izdacima i finansiranju.

Finansijsko izveštavanje je obavezno, a Pravilnikom o načinu sastavljanja, izradi i dostavljanju finansijskih izveštaja propisani su forma i sadržaj izveštaja, obuhvaćeni periodi, kao i obaveze i rokovi za njihovo podnošenje. Ovaj pravilnik definiše univerzalni okvir analitičkog finansijskog izveštavanja. Standardizovana forma i sadržaj finansijskih izveštaja omogućavaju njihovu konsolidaciju, uz primenu jedinstvenih računovodstvenih politika za slične transakcije i događaje. Finansijski izveštaji se izrađuju u sledećim obrascima(20)(10):

1) Bilans stanja,
2) Bilans uspeha,
3) Izveštaj o kapitalu – rashodi i prihodi,
4) Izveštaj o novčanim tokovima i
5) Izveštaj o izvršenju budžeta

Finansijski izveštaji se dostavljaju Trezoru i izrađuju se na periodičnom i godišnjem nivou. Periodično izveštavanje uključuje tromesečne izveštaje o izvršenju budžeta, pri čemu budžetski korisnici i organizacije socijalnog osiguranja redovno pripremaju i podnose ove izveštaje (22).

Za potrebe Statistike državnih finansija (Government Finance Statistics 2014 – GFS), države sastavljaju set od četiri finansijska izveštaja:

1) Bilans stanja,
2) Izveštaj o aktivnostima,
3) Izveštaj o ostalim ekonomskim tokovima i
4) Izveštaj o izvorima i upotrebi novčanih sredstava.

Izveštaj o aktivnostima prikazuje transakcije unutar opšte države u datom periodu, razvrstane prema uticaju na pozicije bilansa stanja. Ove transakcije se klasifikuju kao:

1) One koje utiču na neto imovinu – prihodi i rashodi,
2) Transakcije koje se odnose na nefinansijsku imovinu,
3) Transakcije koje se odnose na finansijsku imovinu i obaveze.

Na osnovu ovog izveštaja mogu se izračunati pokazatelji Neto rezultata aktivnosti i Neto rezultata pozajmljivanja – zaduživanja. Izveštaj o ostalim ekonomskim tokovima prikazuje promene u imovini, obavezama i neto vrednosti koje su rezultat događaja van kontrole države. Izveštaj o izvorima i upotrebi novčanih sredstava sadrži pregled ukupnih izvora i upotrebe novčanih sredstava, omogućavajući procenu likvidnosti opšte države. Izveštaji su prilagođeni različitim računovodstvenim osnovama, omogućavajući uvid u buduće novčane tokove i transakcije koje ne utiču na gotovinske tokove (13).

ZAKLJUČAK

Na osnovu analize nekoliko zemalja u razvoju, koje su detaljno razmatrane u ovom radu, mogu se izvući sledeći ključni zaključci:

Gotovo sve zemlje u razvoju u Evropi, u različitim stepenima, prepoznaju značaj efikasne organizacije javnog sektora u različitim oblastima. Iako su u razvijenim zemljama javne usluge obično bolje razvijene, u zemljama u razvoju javni sektor se suočava sa izazovima vezanim za manji obim usluga usled nižih državnih prihoda. Što je zemlja razvijenija i ima viši životni standard, to su i prihodi države veći, čime se stvara više prostora za pružanje usluga javnog karaktera. Istovremeno, viši životni standard stvara i veće potrebe stanovništva, što dovodi do većeg učešća javnog sektora u pružanju određenih usluga koje u zemljama u razvoju možda nisu dovoljno razvijene.

Međutim, ovo pravilo nije uvek primenjivo na sve evropske zemlje. Dok su zemlje Evropske unije, u skladu sa konceptom države blagostanja, sklonije razvijanju većeg javnog sektora, anglosaksonske zemlje imaju tendenciju da zadrže minimalistički pristup uloge države u ekonomiji. Zemlje koje su se opredelile za širi javni sektor postigle su bolju efikasnost i bolje performanse u poređenju sa onima koje su zadržale manju ulogu države u privredi.

Razlike u pristupu organizaciji javnog sektora imaju za posledicu specifičnu strukturu i specifičan način finansijskog izveštavanja javnog sektora, te nije moguće uvek pristupiti analizi svih zemalja na identičan način. Međutim, ono što se može primetiti jeste da je finansijsko izveštavanje, pod uticajem primene međunarodnih standarda finansijskog izveštavanja postalo sličnije među zemljama u razvoju, posebno kada su u pitanju struktura i sadržaj finansijskih izveštaja.

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Public Sector Financial Reporting of Selected Developing Countries

Summary: This paper analyses the quality of public sector financial reporting in developing countries, highlighting its role in ensuring transparency, accountability and efficient management of public resources. Given the specific economic and institutional challenges that these countries face, the research focuses on a comparative analysis of regulatory frameworks, accounting practices and the degree of compliance with international financial reporting standards. The analysis shows that poor compliance with international standards, lack of capacity to implement reforms and limited availability of accurate and timely data can hamper the management of public funds and reduce public trust. It is noticeable that improving financial reporting in the public sector requires systemic reforms, better implementation of accounting standards and strengthening of supervisory institutions, which could contribute to increasing fiscal discipline and attracting investments.

Key words: financial reporting, public sector, developing countries, transparency, international standards

Adriana Repac[1]

PROFESSIONAL PAPER
UDC 007.5:656

DOI: 10.46793/Rev25109.147R
Received: 10.03.2025.
Accepted: 11.03.2025.
Published: 31.03.2025.

Ottometric Secures $10M Series A Financing to Advance AI-Powered ADAS Validation

Summary: *Ottometric is a technology company specializing in the automation and validation of Advanced Driver Assistance Systems (ADAS). The company recently secured $10 million in Series A funding led by Schooner Capital, with participation from several prominent investors. This financial boost will support further development of Ottometric's AI-powered platform, which enhances the efficiency and scalability of ADAS validation processes. By leveraging proprietary data distillation technology, the platform significantly reduces the volume of sensor data while preserving critical safety information, allowing for faster, more cost-effective system validation. The goal is to address rising industry demands for safety, regulatory compliance, and reduced time to market. The new investment marks an important milestone for Ottometric's continued global growth.*

Keywords: *ADAS validation, artificial intelligence, automotive technology, sensor data, automation, investment*

[1] ALFA BK University, Ottomeric.
E-mail: adriana.repac@ottometric.com

INTRODUCTION

By addressing big data management, training, and real-world validation challenges, Ottometric helps companies save millions in development costs, enhance reliability, meet safety standards, and accelerate time to market" (1).

FUNDING ROUND LED BY SCHOONER CAPITAL WILL ACCELERATE GROWTH AND PRODUCT DEVELOPMENT

BOSTON, MA/NOVI SAD, SERBIA – 04/09/2025

Ottometric, an emerging technology leader in the validation of Advanced Driver Assistance Systems (ADAS), today announced the successful closing of its $10 Million Series A financing. The round was led by Schooner Capital, with participation from existing investors Rally Venture and Proeza Ventures, as well as new investors, including PS27 and Somersault Ventures. The new capital will support Ottometric's rapid growth and accelerate the development of its breakthrough ADAS validation platform.

ADAS includes safety-critical features such as AEB (Automatic Emergency Braking) and LDW (Lane Departure Warning), as well as driver-assistance features such as ACC (Adaptive Cruise Control) and TSR (Traffic Sign Recognition). ADAS solutions are developed and validated using data from a complex network of sensors, including cameras, radar, lidar and ultrasonic sensors. However, the traditional validation process remains inefficient and unscalable. Automakers and suppliers typically spend over a year and up to $100M per vehicle model on ADAS development and testing to comply with government regulations and ensure safety. This process produces petabytes of data, which are currently manually analyzed before the start of vehicle production.

Ottometric's AI-powered platform automates and streamlines ADAS development and validation, helping companies identify and fix sensor, system and software issues. Its proprietary data distillation technology classifies vast amounts of sensor data into structured insights, dramatically reducing dataset sizes while ensuring critical safety scenarios are fully captured. This significantly improves system accuracy and reduces validation costs and timelines by over 50%.

"Ottometric is tackling one of the most pressing challenges in automotive technology today: the skyrocketing cost and complexity of ADAS validation," said Joseph Burke, Founder and CEO of Ottometric. "We are transforming a cumbersome, manual process into an automated, scalable solution that delivers actionable insights in days rather than months. This funding validates our approach and will help us scale to meet the growing demand from Tier-1 suppliers and OEMs."

As part of the investment, Orhan Gazelle, Managing Director at Schooner Capital, will join Ottometric's Board of Directors. "Ottometric's AI-powered platform delivers a remarkable improvement in efficiency, reducing costs while enhancing the reliability of ADAS solutions," said Gazelle. "We are excited to support Ottometric in helping manufacturers navigate regulatory challenges and bring safer, more advanced driver assistance systems to market faster than ever before."

Since raising its Series Seed in 2023, Ottometric has built strong momentum, steadily expanding its customer base of Tier-1 suppliers and OEMs while advancing its product capabilities. With Ottometric, manufacturers can accelerate the deployment of next-generation ADAS solutions to improve driver safety, gain a competitive edge and ensure compliance with evolving government regulations.

ABOUT OTTOMETRIC

Ottometric is a software company focused on automating and streamlining the validation and training processes for Advanced Driver Assistance Systems (ADAS). The company is based in the United States and has an R&D team in Novi Sad, Serbia. Founded in 2019 by automotive industry veterans who have been instrumental in the evolution of ADAS over the past decade, Ottometric provides its automation solutions to OEMs, Tier-1 and Tier-2 suppliers whose current development and validation methods are human-intensive, slow, and costly. Ottometric helps these companies save millions of dollars while significantly improving system performance and reducing time to market. The company is backed by leading venture capital firms including Schooner Capital, Rally Ventures, Proeza Ventures, Goodyear Ventures, and Trucks VC.

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Adriana Repac[1]

STRUČNI RAD
UDK 007.5:656

Primljen: 10.03.2025.
Prihvaćen: 11.03.2025.
Objavljen: 31.03.2025.

Ottometric obezbedio 10 miliona dolara za finansiranje unapređenja AI platforme za validaciju naprednih sistema pomoći vozaču (ADAS)

Rezime: *Ottometric je tehnološka kompanija specijalizovana za automatizaciju i validaciju naprednih sistema za pomoć vozaču (ADAS). Kompanija je nedavno obezbedila 10 miliona dolara u okviru Series A runde finansiranja koju predvodi Schooner Capital, uz učešće nekoliko značajnih investitora. Ova investicija omogućiće dalji razvoj AI platforme koja unapređuje efikasnost i skalabilnost procesa validacije ADAS sistema. Zahvaljujući sopstvenoj tehnologiji za obradu podataka, platforma značajno smanjuje obim senzorskih podataka, a da pri tom zadržava ključne informacije vezane za bezbednost, omogućavajući bržu i isplativiju validaciju sistema. Cilj je odgovoriti na rastuće zahteve industrije u pogledu bezbednosti, usklađenosti sa propisima i bržeg izlaska na tržište. Nova investicija predstavlja važan korak u daljoj globalnoj ekspanziji kompanije.*

Ključne reči: *validacija ADAS sistema, veštačka inteligencija, automobilska tehnologija, senzorski podaci, automatizacija, investicija*

[1] ALFA BK Univerzitet, Ottomeric.
E-mail: adriana.repac@ottometric.com

UVOD

Adresiranjem velikih podataka za upravljanje, obuku i izazove validacije u stvarnom svetu, Ottometric pomaže kompanijama da uštede milione u troškovima razvoja, poboljšaju pouzdanost, ispune bezbednosne standarde i ubrzaju vreme izlaska na tržište" (1).

RUNDA INVESTIRANJA PREDVOĐENA FONDOM SCHOONER CAPITAL UBRZAĆE RAST I RAZVOJ PROIZVODA

BOSTON, MASAČUSETS/NOVI SAD, SRBIJA - 09. 04.2025.

Kompanija Ottometric, vodeći inovator u oblasti validacije naprednih sistema pomoći vozaču (ADAS), objavila je zatvaranje A serije finansiranja u iznosu od 10 miliona dolara. Ovu rundu predvodio je investicioni fond Schooner Capital, uz učešće postojećih investitora Rally Venture i Proeza Ventures, kao i novih partnera, među kojima su PS27 i Somersault Ventures. Prikupljena sredstva biće usmerena na ubrzanje rasta kompanije i dalji razvoj inovativne platforme za validaciju ADAS sistema zasnovane na veštačkoj inteligenciji.

ADAS sistemi obuhvataju bezbednosne funkcionalnosti kao što su automatsko kočenje u hitnim situacijama (AEB) i upozorenje na napuštanje saobraćajne trake (LDW), ali i asistenciju vozaču kroz funkcije poput adaptivnog tempomata (ACC) i prepoznavanja saobraćajnih znakova (TSR). Ove funkcionalnosti se razvijaju i testiraju pomoću složenih mreža senzora – uključujući kamere, radare, lidare i ultrazvučne senzore. Ipak, tradicionalni proces validacije i dalje je spor, skup i teško skalabilan. Proizvođači automobila i dobavljači često troše više od godinu dana i do 100 miliona dolara po modelu vozila kako bi ispunili regulatorne zahteve i obezbedili bezbednost. Taj proces generiše petabajte podataka, koji se trenutno analiziraju manuelno pre početka serijske proizvodnje.

AI platforma kompanije Ottometric automatski upravlja i optimizuje razvoj i validaciju ADAS sistema, pomažući kompanijama da brzo identifikuju i otklone probleme u vezi sa senzorima, softverom i sistemima. Njihova vlasnička tehnologija za destilaciju podataka klasifikuje ogromne količine podataka u strukturisane uvide, značajno smanjujući obim datasetova, uz zadržavanje ključnih bezbednosnih scenarija. Ovim pristupom postiže se povećana tačnost sistema i smanjuju se troškovi i vreme validacije za više od 50%.

„Ottometric rešava jedan od najozbiljnijih izazova u današnjoj automobilskoj industriji – sve veće troškove i složenost ADAS validacije," izjavio je Joseph Burke, osnivač i izvršni direktor kompanije Ottometric. „Transformišemo zahtevan, ručni proces u automatizovano, skalabilno rešenje koje pruža primenljive uvide u roku od nekoliko dana, umesto meseci. Ovo finansiranje potvrđuje naš pristup i omogućava nam da skaliramo u skladu sa rastućom potražnjom Tier-1 dobavljača i OEM proizvođača."

Kao deo investicije, Orhan Gazelle, izvršni direktor fonda Schooner Capital, pridružiće se Upravnom odboru kompanije Ottometric. „Platforma koju razvija Ottometric donosi izuzetno povećanje efikasnosti – smanjuje troškove, a ujedno povećava pouzdanost ADAS rešenja," izjavio je Gazelle. „Radujemo se što ćemo podržati Ottometric u njihovoj misiji da proizvođačima vozila olakšaju ispunjavanje regulatornih zahteva i ubrzaju uvođenje bezbednijih i naprednijih sistema pomoći vozaču."

Od kada je 2023. godine prikupila sredstva u okviru Series Seed in 2023, kompanija Ottometric beleži snažan rast – konstantno proširuje bazu klijenata među Tier-1 dobavljačima i OEM proizvođačima, istovremeno unapređujući funkcionalnosti svoje platforme. Uz Ottometric, proizvođači mogu ubrzati implementaciju sledeće generacije ADAS rešenja, povećati bezbednost na putevima, ostvariti konkurentsku prednost i obezbediti usklađenost sa sve zahtevnijim regulativama.

O KOMPANIJI OTTOMETRIC

Ottometric je softverska kompanija posvećena automatizaciji i optimizaciji procesa validacije i treniranja naprednih sistema pomoći vozaču (ADAS). Kompanija ima sedište u Sjedinjenim Američkim Državama, dok se njen tim za istraživanje i razvoj (R&D) nalazi u Novom Sadu, Srbija. Osnovana 2019. godine od strane stručnjaka sa višegodišnjim iskustvom u razvoju ADAS tehnologija, kompanija pruža svoja rešenja proizvođačima vozila (OEM), kao i Tier-1 i Tier-2 dobavljačima, koji se oslanjaju na zahtevne, spore i skupe metode testiranja. Zahvaljujući Ottometric platformi, ove kompanije mogu značajno smanjiti troškove, poboljšati performanse sistema i ubrzati plasman proizvoda na tržište.

Kompaniju podržavaju vodeće fondove rizičnog kapitala, uključujući Schooner Capital, Rally Ventures, Proeza Ventures, Goodyear Ventures i Trucks VC.

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Jozefina Beke-Trivunac[1]
Snežana Knežević[2]
Jelena Krpić[3]

STRUČNI RAD
UDK 657.6:553.04 (497.11)

DOI: 10.46793/Rev25109.155BT
Primljen: 15.02.2025.
Prihvaćen: 10.03.2025.
Objavljen: 15.04.2025.

MRS JS 50 Istraživanje i procenjivanje mineralnih resursa – primer Rio Tinto

Rezime: *U ovom radu prikazani su najznačajniji zahtevi Međunarodnog računovodstvenog standarda za javni sektor, MRS JS 50 Istraživanje i procenjivanje mineralnih resursa. Ilustracija primene zahteva ovog MRS JS data je na osnovu napomena iznetih u finansijskim izveštajima kompanije Rio Tinto.*

Ključne reči: *IPSAS 50, odloženi troškovi, troškovi istraživanja i razvoja*

[1] ALFA BK Univerzitet, Srbija.
E-mail: jozefina.beke@alfa.edu.rs
ORCID iD: https://orcid.org/0000-0002-7394-7006

[2] Univerzitet u Beogradu, Fakultet organizacionih nauka, Srbija.
E-mail: snezana.knezevic@fon.bg.ac.rs
ORCID iD: https://orcid.org/0000-0001-9833-7274

[3] ALFA BK Univerzitet, Srbija.
E-mail: jelena.krpic@alfa.edu.rs

UVOD

U novembru 2024. godine objavljen je Međunarodni računovodstveni standard za javni sektor MRS JS 50 Istraživanje i procenjivanje mineralnih resursa (MRS JS 50) Ovaj standard primenjuju entiteti iz javnog sektora koji pripremaju svoje finansijske izveštaje na principu obračunskog računovodstva. (2).

Standardom se uređuje finansijsko izveštavanje o istraživanju i procenjivanju mineralnih resursa od strane rudarskih entiteta u javnom sektoru čije je poslovanje komercijalne prirode. Kako Odbor za Međunarodne računovodstvene standarde u javnom sektoru (IPSASB) nije prepoznao nikakve posebne razloge zbog kojih bi se računovodstveno obuhvatanje ovih aktivnosti od strane javnih entiteta razlikovalo od onih koje zahteva Međunarodni standard finansijskog izveštavanja za privatne entitete IFRS 6 Istraživanje i procenjivanje mineralnih resursa (IFRS 6), MRS JS 50 skoro je identičan sa IFRS 6. Razlike koje se javljaju između ova dva standarda rezultat su razlika u terminologiji i formi samih standarda.

O odloženim troškovima kao nematerijalnim sredstvima

Troškovi koji nisu iskazani kao rashod perioda u kojem su nastali, već se njihovo iskazivanje u okviru troškova odlaže, kapitalizuju se kao sredstva. Razlog odlaganja je očekivanje da će ta sredstva donositi ekonomske koristi u budućim periodima. Sve veća složenost poslovnih aktivnosti proširuje broj i vrstu odloženih troškova. Primeri su troškovi istraživanja i razvoja i troškovi razvoja računarskog softvera. Motivacija za odlaganje troškova je da se troškovi bolje podudaraju sa očekivanim budućim koristima. Ova motivacija leži u osnovi kapitalizacije svih dugoročnih sredstava. Ako troškovi koji su nastali u tekućem periodu donose ekonomske koriste u budućem periodu, bilo u vidu prihoda, bilo u vidu smanjenja rashoda, onda entitet može da odloži odgovaraući trošak za budući period. Na primer, ako entitet ima velike početne troškove u radu novih, boljih, ili efikasnijih objekata, on može odložiti ove troškove i upariti (amortizovati) ih sa očekivanim budućim ekonomskim koristima.

O računovodstvu troškova istraživanja i razvoja

Računovodstvo troškova istraživanja i razvoja suočava se sa visokim neizvesnostima krajnjih koristi koje proizilaze iz aktivnosti istraživanja i razvoja. Troškovi nastali u ranim fazama istraživanja iskazuju se kao trošak perioda u kojem su nastali, jer se smatra da postoji značajna neizvesnost u vezi njihovih ishoda. Aktivnosti istraživanja i razvoja koje se javljaju u kasnijim fazama – u fazi "razvoja", kao što je unapređenje ili poboljšanje postojećeg proizvoda – imaju izvesnije i merljivije buduće koristi. IFRS omogućavaju entitetima da takve troškove istraživanja i razvoja kapitalizuju i iskazuju kao nematerijalnu imovinu u bilansu stanja. Nematerijalna imovina se zatim amortizuje tokom svog korisnog veka trajanja. Ključ za kapitalizaciju je da je entitet u stanju da pokaže da je postignuta tehnološka izvodljivost i da postoji jasna mogućnost za prodaju proizvoda.

Izdaci i troškovi koji su povezani sa aktivnostima istraživanja i razvoja uključuju: materijale, opremu i objekte stečene ili izgrađene za određeni projekat istraživanja i razvoja, ili kupljenu nematerijalnu imovinu koja nema alternativnu buduću upotrebu (u projektima istraživanja i razvoja ili na drugi način), materijale koji se troše u istraživačko-razvojnim aktivnostima i amortizaciju opreme i objekata i nematerijalne imovine koja se koristi u aktivnostima istraživanja i razvoja koje imaju alternativne buduće namene, kao i plate i druge srodne troškove osoblja angažovanog u istraživačko-razvojnim aktivnostima.

O troškovima istraživanja i razvoja u ekstraktivnim industrijama

Potraga za novim depozitima prirodnih resursa važna je za kompanije u ekstraktivnim industrijama. Ove industrije uključuju naftu, prirodni gas, metale, ugalj i nemetalne minerale. TRaganje za prirodnim resursima karakteriše visok rizik, koji je povezan sa neizvesnošću konačnih rezultata istraživanja. Za ekstraktivnu industriju, problem je da li su troškovi istraživanja i razvoja, za koje se razumno očekuje da će se nadoknaditi iz prodaje prirodnih resursa, rashodi perioda u kojem su nastali ili se mogu kapitalizovati i amortizovati tokom budućeg perioda u kojem se očekuje da će donositi ekonomske koristi.

ZAHTEVI MRS JS 50 TROŠKOVI ISTRAŽIVANJA I PROCENJIVANJA

MRS JS 50 daje smernice koje se odnose na troškove istraživanja i procenjivanje mineralnih resursa (na primer, minerala, nafte, prirodnog gasa i sličnih neregenerativnih resursa), kao i troškove određivanja tehničke izvodljivosti i komercijalne održivosti vađenja mineralnih resursa. Ovaj standard se ne primenjuje na troškove koji su nastali pre započinjanja istraživanja i procenjivanja mineralnih resursa, kao što su troškovi nastali pre nego što entitet stekao zakonsko pravo na istraživanje određenog područja, niti nakon dokazivanja tehničke izvodljivosti i komercijalne opravdanosti vađenja mineralnih resursa.

Ključni termini u ovom Standardu su:

- **Sredstva/Imovina za istraživanje i procenjivanje** koja označava izdatke za istraživanje i procenjivanje koji se priznaju kao sredstva u skladu sa računovodstvenim politikama entiteta.
- **Izdaci za istraživanje i procenjivanje** koji označavaju izdatke izazvane od strane entiteta u vezi sa istraživanjem i procenjivanjem mineralnih resursa pre nego što su tehnička izvodljivost i komercijalna održivosti vađenja mineralnih resursa dokazane.
- **Istraživanje i procenjivanje mineralnih resursa** koje označava potragu za mineralnim resursima, uključujući minerale, naftu, prirodni gas i slične neobnovljive resurse nakon što je entitet stekao zakonska prava da istraži određeno područje, kao i utvrđivanje tehničke izvodljivosti i komercijalne održivosti ekstrakcije mineralnih resursa.

Pri utvrđivanju računovodstvenih politika priznavanja sredstava za istraživanje i procenjivanje, entitet primenjuje tačku 12 MRS JS 3 Računovodstvene politike, promene u računovodstvenim procenama i greške, prema kojoj, u slučaju nepostojanja standarda koji se posebno odnosi na predmetnu transackiju, rukovodstvo prosuđuje o izboru politike koja najbolje pruža informacije koje su merodavne za verno prikazivanje finansijskog položaja, rezultata finansijskog poslovanja i novčane tokove entiteta i zadovoljava kvalitativne karakteristike kao što su razumljivost, pravovremenost, uporedivost i proverljivost i uzima u obzir ograničenja informacija uključenih u finansijske izveštaje opšte namene i ravnotežu između kvalitativnih karakteristika. (1)

Entitet utvrđuje računovodstvenu politiku u kojoj se navodi koji se rashodi priznaju kao sredstva za istraživanje i procenjivanje. Utvrđena računovodstvena politika primenjuje se dosledno. Prilikom donošenja ove odluke, entitet razmatra stepen do kojeg se rashodi mogu povezati s pronalaženjem specifičnih mineralnih resursa. Primeri troškova koji mogu biti uključeni u početnom merenju sredstava istraživanja i procenjivanja su: sticanje prava na istraživanje, topografske, geološke, geohemijske i geofizičke studije, istraživačko bušenje, pretraživanje rovova, uzorkovanje i aktivnosti povezane sa procenom tehničke izvodljivosti i komercijalne održivosti vađenja mineralnih resursa. Sredstva istraživanja i procenjivanja inicijalno se mere po nabavnoj vrednosti ili ceni koštanja. Pri naknadnom merenju, sredstva za istraživanje i procenjivanje iskazuju se po istorijskoj vrednosti ili poštenoj/fer vrednosti, zavisno od modela koji je rukovodstvo izabralo.

U skladu sa zahtevima za prikazivanje sredstava za istraživanje i procenjivanje, entitet klasifikuje sredstva za istraživanje i procenjivanje kao materijalna ili kao nematerijalna, saglasno prirodi stečene imovine. Primer nematerijalnog sredstva je pravo na bušenje, dok je bušilica primer materijalnog sredstva.

Standard MRS JS 50 Troškovi istraživanja i procenjivanja stupa na snagu 1. Januar 2027. godine.

ILUSTRACIJA PRMENE FINANSIJSKOG IZVEŠTAVANJA O IZDACIMA ZA ISTRAŽIVANJE I PROCENJIVANJE – PRIMER POSLOVNE GRUPACIJE RIO TINTO

Rio Tinto plc, sa sedištem u Londonu u Velikoj Britaniji, koji se kotira na Londonskoj i Njujorškoj berzi, i Rio Tinto Limited, sa sedištem u Australiji, koji se kotira na Australijskoj berzi hartija od vrednosti, formirali su 1995. godine kompaniju sa dualnom strukturom listinga (DLC). Prema DLC-u, Rio Tinto plc i Rio Tinto Limited posmatraju se kao jedinstveno ekonomsko preduzeće, sa zajedničkim upravnim odborima, a akcionari obe kompanije imaju zajednički ekonomski interes u DLC-u.

Rio Tinta se bavi pronalaženjem, rudarstvom i preradom mineralnih resursa. Glavni proizvodi su ruda gvožđa, aluminijum, bakar, industrijski minerali (borati, titanijum dioksid i so) i dijamanti. Aktivnosti se odvijaju u celom svetu, a najviše u Australiji i Severnoj Americi, sa značajnim preduzećima u Aziji, Evropi, Africi i Južnoj Americi.

Poslovna grupacija Rio Tinto priprema finansijske izveštaje u skladu sa međunarodnim računovodstvenim standardima usvojenim od strane Ujedinjenog Kraljevstva i Međunarodnim standardima finansijskog izveštavanja koje je izdao Odbor za Međunarodne računovodstvene standarde. U svom finansijskom izveštaju za 2024. godinu, poslovna grupacija Rio Tinto, između ostalog, obelodanjuje i podatke o ulaganjaima u istraživanja i procenjivanja mineralnih resursa. Ovi podaci izneti su u bilansu uspeha i odgovarajućoj napomeni.

U konsolidovanom bilansu stanja Rio Tinto Grupe izdaci za istraživanje i procenjivanje (engl. Exploration and evaluation expenditure) iskazani su kao posebna stavka u okviru poslovnih rashoda (Rio Tinto, 2025, 162),. Analiza strukture poslovnih prihoda i rashoda pokazuje da izdaci za istraživanje i procenjivanje iznose 1,74% poslovnih prihoda u 2024. godini, 2,28% poslovnih prihoda u 2023. godini i 1,6% poslovnih prihoda u 2022. godini. Više informacija o ovim izdacima dato je napomeni 8 Izdaci za istraživanje i procenjivanje (engl. Exploration and evaluation expenditure). Troškovi istraživanja i procenjivanja uključuju troškove koji se direktno mogu pripisati: istraživanju i analizi postojećih podataka o istraživanju, sprovođenju geoloških studija, istraživačkom bušenju i uzorkovanju, ispitivanju i testiranju metoda ekstrakcije i tretmana, sastavljanju različitih studija (red veličine, pre-izvodljivost i izvodljivost) i / ili prethodni radovi na rudničkim lokacijama pre obaveštenja da se ono nastavi. Izdaci za istraživanje odnose se na početnu potragu za depozitima sa ekonomskim potencijalom. Izdaci za istražne aktivnosti koje preduzima Grupa se ne kapitalizuju, već se iskazuju kao rashod u periodu u kojem su nastali. Izdaci za procenjivanje odnose se na detaljnu procenu depozita ili drugih projekata (uključujući projekte topionica i rafinerija) za koje je utvrđeno da imaju ekonomski potencijal. Ovi troškovi se takođe iskazuju kao rashod sve dok odgovarajući projekat nije dovoljno uznapredovao. (3, s. 179).

U napomeni 12 Nematerijalna sredstv (engl. Intangible assets) uz finansijske izveštaje, detaljno su navedene računovodstvene politike priznavanja izdataka za istraživanje i procenjivanje kao sredstva, tj. politike kapitalizovanja troškova istraživanja i procenjivanja. Troškovi procenjivanja odnose se na detaljnu procenu depozita ili drugih projekata (uključujući topionice i rafinerije projekte) koji su identifikovani kao oni koji imaju ekonomski potencijal. Kapitalizacija troškova procenjivanja počinje kada postoji visok stepen poverenja da će Grupa utvrditi da je projekat komercijalno održiv; to jest, da će projekat obezbediti zadovoljavajući prinos u odnosu na uočene rizike i, stoga se smatra verovatnim da će buduće ekonomske koristi priticati u Grupu. Stav Grupe je da postoji visok stepen poverenja ako je ono veće od 50% sigurnosti, a manje od 90% sigurnosti. Procena da li postoji visok stepen poverenja da će Grupa na kraju utvrditi da je projekat procenjivanja komercijalno održiv zahteva procenu i razmatranje svih merodavnih činilaca kao što su: priroda i cilj projekta, trenutna faza projekta, vremenski okvir projekta, trenutne procene neto sadašnje vrednosti projekta (uključujući analize osetljivosti za ključne pretpostavke) i glavne rizike projekta. (3, s. 183)

Finansijski izveštaji Grupe Rio Tinto dostupni su na https://www.riotinto.com/en/invest/reports/annual-report.

LITERATURA

(1) IPSASB (2024) IPSAS 3 – Accounting policies, changes in accounting estimates and errors, 2024 Handbook of International Public Sector Accounting Pronouncements.
(2) IPSASB (2024a) International Public Sector Accounting Standard IPSAS 50, Exploration for and Evaluation of Mineral Resources.
(3) Rio Tinto (2025), Annual report 2024, str. 162. https://www.riotinto.com/en/invest/reports/annual-report.

Adriana Repac[1]

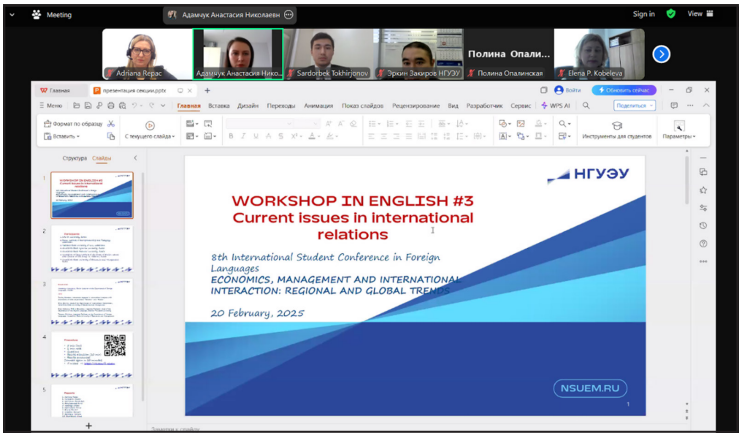
OVERVIEW

Received: 04.03.2025.
Accepted: 10.03.2025.
Published: 15.04.2025.

Novosibirsk State University of Economics and Management *The 8th International Scientific and Practical Conference on Foreign Languages*

On February 20, 2025, **the 8th International Scientific and Practical Conference on Foreign Languages *Economics, Management, and International Interaction: Regional and Global Trends*** was held, organized by the Novosibirsk State University of Economics and Management. This prestigious academic event gathered participants from various countries, allowing them to present their research and exchange ideas on contemporary economic and managerial challenges.

The conference program included panel discussions and workshops in Russian, Chinese, Japanese, German, French, and English.



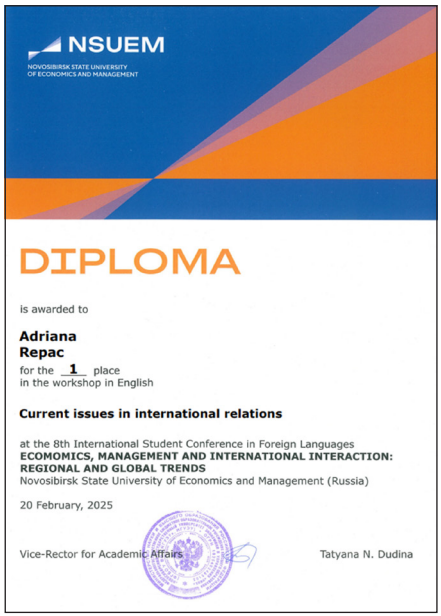
Alfa BK University was proudly represented by **Adriana Repac** (Master's student, Trade program)**, Sofija Ljustanovic** (third-year Economics student) **and Milos Zeljkovic**

[1] ALFA BK Univerzitet, Serbia.
E-mail: adriana.repac@gmail.com

(third-year Economics student), whose papers significantly contributed to the quality of discussions in various sections.

A remarkable achievement was made by **Adriana Repac**, who won **first place** in the *Current Issues in International Relations,* the workshop in English language, with her paper "*Data Collection Methodology and Tool"*. What set her work apart was the combination of theoretical approaches and practical application in a business environment. Through a case study of an international IT company where she works, Adriana demonstrated how modern data collection methodologies are utilized in real-world business processes. Her presentation was distinguished by exceptional clarity, expertise, and analytical approach, while the positive reactions from the jury and audience further confirmed the relevance and quality of her research.

In addition to Adriana, **Sofija Ljustanovic** participated in the Innovations and *Strategies in Contemporary Business and Society* section, where she presented her paper Tourism of the City of Prijepolje: Potential for Regional Economic Development. **Milos Zeljkovic** participated in the *Modern Trends in Global and Regional Economy* section, presenting on current challenges in the global and regional economy.


NSUEM
NOVOSIBIRSK STATE UNIVERSITY OF ECONOMICS AND MANAGEMENT

DIPLOMA

is awarded to

Adriana Repac

for the 1 place in the workshop in English

Current issues in international relations

at the 8th International Student Conference in Foreign Languages
ECOMOMICS, MANAGEMENT AND INTERNATIONAL INTERACTION: REGIONAL AND GLOBAL TRENDS
Novosibirsk State University of Economics and Management (Russia)

20 February, 2025

Vice-Rector for Academic Affairs — Tatyana N. Dudina

Participation in the conference in Novosibirsk represents a significant step in the academic and professional development of **Alfa BK University** students, allowing them to present their research on an international stage and establish connections with colleagues and experts from various parts of the world. This success opens new opportunities for further research and professional prospects, reaffirming the quality of work and education at our university.

Adriana Repac[1]

OSVRT

Primljen: 04.03.2025.
Prihvaćen: 10.03.2025.
Objavljen: 15.04.2025.

Novosibirski državni univerzitet ekonomije i menadžmenta *VIII Međunarodna naučno-stručna konferencija na stranim jezicima*

Dana 20. februara 2025. godine održana je VIII Međunarodna naučno-praktična konferencija na stranim jezicima *Ekonomija, menadžment i međunarodna interakcija: regionalni i globalni trendovi*, u organizaciji Novosibirskog državnog univerziteta ekonomije i menadžmenta. Ovaj prestižni akademski događaj okupio je učesnike iz različitih zemalja, omogućivši im da predstave svoja istraživanja i razmene ideje o savremenim ekonomskim i menadžerskim izazovima.

Program konferencije uključio je panel diskusije i radionice na ruskom, kineskom, japanskom, nemačkom, francuskom i engleskom jeziku.

Alfa BK Univerzitet su na konferenciji predstavljali: Adriana Repac (studentkinja master studija, smer Trgovina), Sofija Ljuštanović (strudentkinja treće godine Ekonomije) i Miloš Zeljković (student treće godine Ekonomije), čiji su radovi značajno doprineli kvalitetu diskusija u različitim sekcijama.

Poseban uspeh ostvarila je Adriana Repac, osvojivši prvo mesto u sekciji *Current Issues in International Relations* radionici na engleskom jeziku, sa radom "*Data Collection Methodology and Tools*". Ono što je njen rad izdvojilo jeste spoj teorijskog pristupa i konkretne primene u poslovnom okruženju. Adriana je, kroz studiju slučaja internacionalne IT kompanije u kojoj radi, demonstrirala kako se savremene metodologije prikupljanja podataka koriste u realnim poslovnim procesima. Njen nastup odlikovala je izuzetna jasnoća, stručnost i analitički pristup, a pozitivne reakcije žirija i publike samo su potvrdile relevantnost i kvalitet njenog istraživanja.

Pored Adriane, Sofija Ljuštanović je učestvovala u sekciji *Innovations and Strategies in Contemporary Business and Society*, gde je predstavila rad na temu "*Tourism of the City of Prijepolje: Potential for Regional Economic Development*". Miloš Zeljković je učestvovao u sekciji "*Modern Trends in Global and Regional Economy* " koji objašnjava aktuelne izazove u globalnoj i regionalnoj ekonomiji.

[1] ALFA BK Univerzitet, Srbija.
E-mail: adriana.repac@gmail.com

Učešće na konferenciji u Novosibirsku predstavlja značajan korak u akademskom i profesionalnom razvoju studenata **Alfa BK Univerziteta**, omogućavajući im da predstave svoja istraživanja na međunarodnoj sceni i uspostave kontakte sa kolegama i stručnjacima iz različitih delova sveta. Ovaj uspeh otvara nove mogućnosti za dalja istraživanja i profesionalne prilike, potvrđujući kvalitet rada i obrazovanja na ovom univerzitetu.

Zorica Đurić[1]
Violeta Dimić[2]

OVERVIEW

Panel Discussion: *Benefits and Challenges of Implementing Modern Technologies from a Sustainability Perspective in Economic Practice*

Under the auspices of the International Scientific Conference "Alfatech" organized by the Faculty of Information Technology at ALFA BK University and the Institute for Strategic Studies and Development "Petar Karić" at ALFA BK University, a panel discussion titled "Benefits and Challenges of Implementing Modern Technologies from a Sustainability Perspective in Economic Practice" was held on February 28, 2025.

Well-known and highly relevant interconnected sustainability issues, such as the rise in carbon dioxide emissions, global warming, and excessive environmental pollution, were examined in this discussion through the lens of the accelerated development of information technology and artificial intelligence and their application in the economy. Additionally, the discussion addressed the question of whether and to what extent new technology contributes to the creation of a new type of waste, exemplified by billions of obsolete mobile phones and other electronic waste.

Given ongoing societal changes, the impact of technological development on all economic and social aspects of life, globalization processes, environmental pollution challenges, and the effects of climate change worldwide, the panel aimed to provide answers to questions such as:

- What are the advantages and main challenges of implementing modern technologies from the perspective of sustainable development and environmental protection in the economy? What key factors influence this? What is the role of artificial intelligence in this process?

[1] ALFA BK University, Serbia.
E-mail: zorica.djuric@alfa.edu.rs
ORCID iD: https://orcid.org/0000-0002-6851-0635

[2] ALFA BK University, Serbia.
E-mail: violeta.dimic@alfa.edu.rs

- How can the current use of modern technologies be assessed through sustainable development and environmental protection processes in the economy?
- How can science and practice be connected in this field? How can science help and support the better application of modern technologies in sustainable development and environmental protection within the economy?
- To what extent are social responsibility and ethics considered in the application of artificial intelligence in businesses? What role does education play?
- To what extent can businesses integrate the social aspects of sustainability through artificial intelligence concerning their employees?
- What should and could be changed to promote sustainable environmental conservation practices in the economy?

Participants from ALFA BK University included Prof. Dr. Zorica Đurić, Assoc. Prof. Dr. Violeta Dimić, Prof. Dr. Jozefina Beke-Trivunac, Prof. Dr. Lidija Madžar, and Prof. Dr. Ivan Đekić. Representatives from *Huawei*, Nataša Šarčević and Aleksandar Plečević, also participated in the panel. Their insights into sustainability in practical business applications attracted significant attention from all participants.

All panelists agreed that the development of modern technologies brings numerous advantages but also challenges, particularly in resource management, cloud infrastructure, and virtualization. A key concern raised was whether, with an abundance of available data, we might become overly dependent on AI and lose critical thinking skills. Simultaneously, automation raises concerns about the future of the workforce and potential job losses. Artificial intelligence is increasingly shaping business operations by enabling advanced analysis and prediction through processing vast amounts of information. The launch of supercomputers requires a careful balance between centralization and decentralization, where a state data center could facilitate energy consumption management. However, the rise of digitalization and data centers increases energy demands, posing a challenge to the electricity supply system in maintaining stability and reducing the ecological footprint. In this context, identifying vulnerable regions and strategically planning social policies are crucial for achieving global goals in combating poverty and climate change. Governments can use regulations to steer technological development toward sustainable and energy-efficient solutions.

Huawei representatives highlighted that *Huawei* is developing inverters for solar power plants, contributing to sustainable development and environmental protection. In the oil industry, the focus is on implementing AI software that analyzes parameters in real time to optimize system performance. Testing these solutions in the domestic market allows for their adaptation to specific needs, while software solutions such as the "all-season marketing" model provide flexible strategies in various conditions. Simultaneously, the company is developing technologies aligned with the European market. The extent to which AI is already being used and what its long-term impact will be remains an open question.

On traditional questions such as whether economic growth threatens the natural environment and human well-being in the short and long term, and whether environmental issues are better addressed through state regulation or left to scientific advancements, all participants agreed that the solution lies in a combination of both and that regulation should not wait for scientific progress.

The panel discussion is part of the international scientific project Sustainable Development and Environmental Protection in the Economy at the Institute for Strategic Studies and Development "Petar Karić" ALFA BK University, project no. 1/2024.

Zorica Đurić[1]
Violeta Dimić[2]

Panel diskusija: *Koristi i izazovi primene savremenih tehnologija sa aspekta održivosti u privrednoj praksi*

Pod pokroviteljstvom Međunarodne naučne konferencije „Alfatech" Fakulteta za informacione tehnologije ALFA BK Univerziteta i Instituta za strategijske studije i razvoj „Petar Karić" ALFA BK Univerziteta, 28. februara 2025. godine, održana je panel diskusija, pod nazivom „Koristi i izazovi primene savremenih tehnologija sa aspekta održivosti u privrednoj praksi".

Dobro poznata, aktuelna međusobno prožimajuća pitanja održivosti, kao što su rast emisije uglljen dioksida, globalno zagrevanje i prekomerna zagađenost prirodnog okruženja ovog puta razmatrana su sa stanovišta uloge ubrzanog razvoja informacione tehnologije i veštačke inteligencije i njihove primene u privredi. Razmatranje je obuhvatilo i pitanje da li, i ako da, u kojoj meri nova tehnologija doprinosi stvaranju nove vrste otpada. Primeri toga su milijarde zastarelih mobilnih telefona i drugog elektronskog otpada.

Imajući u vidu aktuelne društvene promene, uticaj tehnološkog razvoja na sve ekonomske i društvene aspekte života, proces globalizacije, probleme zagađenosti životne sredine i uticaj klimatskih promena u svetu, panel je održan sa ciljem dolaženja do odgovora na pitanja kao što su:

- Koje su prednosti i glavni izazovi primene savremenih tehnologija sa aspekta održivog razvoja i zaštite životne sredine u privredi? Koji ključni činioci utiču na to? Kakva je uloga veštačke inteligencije u tom procesu?
- Kako oceniti sadašnju primenu savremenih tehnologija kroz procese održivog razvoja i zaštite životne sredine u privredi?
- Kako povezati nauku i praksu u ovoj oblasti, odnosno kako nauka može da pomogne i podrži bolju primenu savremenih tehnologija i održivog razvoja i zaštite životne sredine u privredi?

[1] ALFA BK Univerzitet, Srbija.
E-mail: zorica.djuric@alfa.edu.rs
ORCID iD: https://orcid.org/0000-0002-6851-0635

[2] ALFA BK Univerzitet, Srbija.
E-mail: violeta.dimic@alfa.edu.rs

- Koliko je zastupljena društvena odgovornost i etika u primeni veštačke inteligencije u preduzećima? Kakva je uloga obrazovanja?
- Da li privreda i kojoj meri može da primeni socijalne aspekte održivosti kroz primenu veštačke inteligencije kada su pitanju njeni zaposleni radnici?
- Šta bi trebalo i moglo da se izmeni, kako bi se pospešila održiva praksa očuvanja životne sredine u privredi?

U diskusiji na panelu sa strane ALFA BK Univerziteta učestvovali su: prof. dr Zorica Đurić, doc. dr Violeta Dimić, prof. dr Jozefina Beke-Trivunac, prof. dr Lidija Madžar i prof. dr Ivan Đekić. Na panelu su učestvovali i predstavnici *Huawei* kompanije, Nataša Šarčević i Aleksandar Plečević, čija su izlaganja odnosa prema održivosti u praktičnom radu privukla veliku pažnju svih učesnika panela.

Svi učesnici panela bili su saglasni da razvoj modernih tehnologija donosi brojne prednosti, ali i izazove, posebno u oblasti upravljanja resursima, klaud infrastrukture i virtualizacije. Postavlja se pitanje hoćemo li, uz obilje dostupnih podataka, postati zavisni od AI-a i izgubiti sposobnost kritičkog razmišljanja. Istovremeno, automatizacija otvara dilemu o budućnosti radne snage i potencijalnom gubitku radnih mesta. Veštačka inteligencija sve više oblikuje poslovanje, omogućavajući naprednu analizu i predikciju kroz obradu velikih količina informacija. Pokretanje superkompjutera zahteva pažljiv balans između centralizacije i decentralizacije, pri čemu bi državni data centar mogao olakšati upravljanje potrošnjom energije. Međutim, rast digitalizacije i podatkovnih centara povećava energetske zahteve, što predstavlja izazov za sistem elektro snabdevanja u očuvanju stabilnosti sistema i smanjenju ekološkog otiska. U tom kontekstu, prepoznavanje ugroženih regiona i strateško planiranje socijalnih politika ključni su za ostvarenje globalnih ciljeva u borbi protiv siromaštva i klimatskih promena. Država može, putem regulative, usmeravati tehnološki razvoj ka održivim i energetski efikasnim rešenjima.

Predstavnici kompanije *Huawei* ukazali su da *Huawei* razvija invertore za solarne elektrane, doprinoseći održivom razvoju i zaštiti životne sredine. U naftnoj industriji, fokus je na implementaciji AI softvera koji u realnom vremenu analizira parametre kako bi optimizovao rad sistema. Testiranje ovih rešenja na domaćem tržištu omogućava njihovo prilagođavanje specifičnim potrebama, dok softverska rešenja poput „all-season marketing" modela pružaju fleksibilne strategije u različitim uslovima. Paralelno, kompanija razvija tehnologije usklađene s evropskim tržištem. Koliko već sada koristimo AI i kakav će biti njegov dugoročni uticaj, pitanje je koje tek čeka odgovor.

Na klasična pitanja kao što su: koliko ekonomski rast ugrožava prirodnu sredinu i ljudsko blagostanje i kvalitet života na kratak i dugi rok i da li je pitanja ugrožavanja životne sredine bolje rešavati državnom regulativom ili čekati da se sve reši razvojem nauke, svi učesnici su saglasni da je odgovor u njihovoj kombinaciji, i da regulativa ne treba da čeka razvoj nauke.

Panel diskusija je deo međunarodnog naučnog projekta: Održivi razvoj i zaštita životne sredine u privredi, Instituta za strategijske studije i razvoj „Petar Karić" ALFA BK Univerzitet , br. 1/2024.

Zaključci sa okruglog stola *„Poreski sistemi i novi trendovi“*

U organizaciji Saveza studenata Ekonomskog fakulteta Brčko dana 18.03.2025. godine u sali Skupštine Brčko distrikta održan je okrugli sto na temu „Poreski sistemi i novi trendovi“ u kojem je učestvovao veliki broj profesora sa visokoškolskih ustanova iz zemlje i regiona: Ekonomskog fakulteta iz Osijeka, Fakulteta organizacionih nauka iz Beograda, Ekonomskog fakulteta iz Subotice, Ekonomskog fakulteta iz Banja Luke, Ekonomskog fakulteta iz Tuzle i Visoke poslovne škole strukovnih studija iz Valjeva, te predstavnici vlasti, predstavnici Poreske uprave Brčko distrikta i Direkcije za finansije Brčko distrikta. Prisutnima se obratio dekan Ekonomskog fakulteta Brčko prof. dr Srđan Lalić i zahvalio se što su izdvojili vrijeme da učestuju u panel diskusiji koja ima za cilj unapređenje funkcionisanja poreskog sistema i politike, jer od istih zavisi kvalitet našeg svakodnevnog života. Moderator okruglog stola bila je mr Snježana Zarić, viši asistent, a referate po pozivu izložili su prof. dr Domagoj Karačić sa Ekonomskog fakulteta iz Osijeka, doc. dr Ljiljana Tanasić sa Ekonomskog fakulteta iz Brčkog i mr Tatjana Mihajlović, direktor Poreske uprave Brčko distrikta.

Sve do globalne finansijske krize smatralo se da je monetarna politika superiornija u odnosu na fiskalnu politiku, posebno u postizanju makroekonomske stabilizacije. Međutim, finanasijska kriza je ponovo u fokus vratila fiskalnu politiku i fiskalne stimulanse, a pandemija korona virusa potvrdila da nema zdrave ekonomske politike bez koordinacije

[1] Univerzitet u Istočnom Sarajevu.
E-mail: srdjan.lalic.efb@gmail.com

monetarne i fiskalne politike. Međutim, kada se ovaj zaključak spusti na mikro nivo pojavljuju se brojna pitanja. Kako smanjiti otpor plaćanju poreza i osvjetliti vezu između izmirivanja poreskih obaveza od strane poreskih obveznika i mogućnosti države da realizuje ekonomske i socijalne ciljeve? Naredno pitanje je koje su to poreske olakšice i podsticaji koji mogu stimulisati ulaganja u istraživanje, razvoj, ekološku održivost i inovativne industrije uopšte, jer su iste generator razvoja zajednice? Zatim, na koji način stimulisati domaću proizvodnju i pomoći domaćim privrednim subjektima sa se suoče sa inostranom konkurencijom? Konačno, da li je značajno da se u obrazovanju budućih ekonomista veća pažnja posveti poreskom konsaltingu s obzirom na rastuću ulogu poreskih savjetnika kao posrednika između poreskih uprava i poreskih obveznika? Prisutni su raspravljali o ovim i brojnim povezanim pitanjima, a posebno korisnim sugesijama istakli su se prof. dr Snežana Knežević, prof. dr Branimir Kalaš, prof. dr Kosana Vićentijević, prof. dr Željana Jovićić i mr Snježana Zarić.






Nakon višečasovne diskusije donijeti su sljedeći glavni zaključci:

1. Poreski organi moraju da rade na podizanju poreske svijesti u društvu kroz organizovanje edukativnih i informativnih promotivnih kampanja, te intenzivniju saradnju sa obrazovnim institucijama. Veza između izmirivanja poreskih obaveza i mogućnosti države da realizuje ekonomske i socijalne ciljeve mora biti jasno istaknuta i prepoznata od strane privrede i stanovništva;

2. Država treba da prepozna inovativne kompanije, institucije i pojedince, koji su pokretači razvoja ekonomije, i istima pruži diferenciran poreski tretman. U vezi sa tim neophodna je izmjena relevantnih poreskih propisa u entitetima i Brčko distriktu u pravcu uključivanja poreskih podsticaja i olakšica za ulaganje u istraživanje i razvoj, poput odobravanja poreskog kredita po osnovu ulaganja u istraživanje i razvoj ili priznavanje troškova istraživanja i razvoja u uvećanom iznosu u poreskom bilansu (primjer dobre prakse je Srbija);
3. Ekološka održivost može se podstaći kroz poreske olakšice za kompanije i pojedince koji ulažu u obnovljive izvore energije, reciklažu i cirkularnu ekonomiju. Smanjenje stope PDV-a na ekološke proizvode i subvencije za zelene tehnologije predstavljaju konkretne mjere koje bi doprinijele održivijem poslovanju i smanjenju negativnog uticaja na životnu sredinu;
4. Podrška poljoprivredi kroz poreske mjere, poput smanjenja poreza za ekološke proizvođače i subvencionisanje održivih tehnologija, omogućila bi jačanje ruralnih zajednica, povećanje konkurentnosti domaćih poljoprivrednih proizvođača i očuvanje prirodnih resursa;
5. Nepotpuni i neusklađeni poreski propisi o transfernim cijenama u Bosni i Hercegovini omogućavaju poreske zloupotrebe, što zahtijeva regulatorne izmjene u skladu sa međunarodnim smjernicama, kao i bolju koordinaciju i kontrolu;
6. Visokoškolske institucije treba da daju svoj doprinos razvoju profesije poreskih savjetnika kroz inoviranje nastavnih planova i programa, te uspostavljanje stručne saradnje sa državnim poreskim organima.

OSNOVNE INFORMACIJE O ČASOPISU

REVIZOR

Časopis za upravljanje organizacijama, finansije i reviziju

Časopis REVIZOR, od 2023. godine, izdaje Naučno društvo za upravljanje organizacijama iz Beograda. Naučna i izdavačka politika časopisa usklađene su sa ciljevima i zadacima Naučnog društva. Časopis je osnovan 1997. godine od strane Instituta za ekonomiku i finansije, a prvi broj časopisa izišao je 1998. Prvi i dugogodišnji urednik časopisa bio je profesor dr Stanoje Vukić.

NAUČNA POLITIKA ČASOPISA

Časopis REVIZOR pretežno objavljuje radove iz oblasti društvenih nauka, a izuzetno i iz drugih naučnih oblasti, ako je tema rada povezana sa tematikom finansija, rizika i kontrola, računovodstva, forenzike i revizije.

Navedene teme mogu da se obrađuju sa stanovišta mikro i makro ekonomije (ocena rizika iz okruženja), i sa različitim pristupom, kao što su upravljanje organizacijom, menadžment, komunikacija, odgovornosti prema društvenoj zajednici, odgovornosti prema prirodnom okruženju, i slično.

Finansija, rizici i kontrole, računovodstvo, forenzike i revizija nerazdvojno su vezane sa svakim oblikom organizacije,

BASIC INFORMATION ABOUT THE JOURNAL

REVIZOR

Journal of Organization Management, Finance and Auditing

The journal REVIZOR (Journal of Organization Management Finance and Auditing) has been published by the Scientific Society for Organization Management from Belgrade since 2023. The journal was founded in 1997 by the Institute for Economics and Finance, and the first issue was published in 1998. The first and longtime editor of the journal was Professor Dr. Stanoje Vukić.

SCIENTIFIC POLICY OF THE JOURNAL

The journal REVIZOR predominantly publishes papers in the field of social sciences and exceptionally in other scientific fields if the topic is related to finance, risk, controls, accounting, forensics, and auditing.

The mentioned topics can be treated from the point of view of micro and macro economy (environmental risk assessment), and with different approaches, such as organization management, management, communication, responsibilities towards the social community, responsibilities towards the natural environment, and the like.

Finance, risks, and controls, accounting, forensics, and auditing are inseparably connected with every form of organization in all

u svim delatnostima i svim vidovima svojine, tako da je tema o svakoj od njih pokrivena naučnom politikom časopisa. Sve vrste naučnih i stručnih radova značajano doprinose vrednosti časopisa

UREĐIVAČKE POLITIKE

Uređivačke politike časopisa usklađene su sa Pravilnikom o kategorizaciji i rangiranju naučnih časopisa („Službeni glasnik RS" broj 159 od 30. decembra 2020.).

Uputstvo za autore navodi se u svakom broju časopisa.

Časopis objavljuje originalne naučne i pregledne naučne radove i stručne radove koji su dobili pozitivna mišljenja recenzenata. Svaki autor snosi moralnu i etičku odgovornost za podatke objavljene u radu.

Glavni urednik i članovi uređivačkog odbora dužni su da preduzmu sve razumne mere da recenzenti ostanu anonimni tokom i nakon procesa evaluacije u skladu sa procedurom. Spisak recenzenata se daju u prvom broju časopisa iz svake kalendarske godine.

Recenzenti su dužni da stručno i u zadatim rokovima dostave glavnom uredniku ocenu vrednosti i tačnosti istraživanja.

U svom radu, redakcija primenjuje Committee on Publication Ethics (COPE) Smernice (COPE Guidance) koje se bave osnovne politike i prakse koje su potrebni časopisima i izdavačima da bi se dostigli najviši standardi etike objavljivanja (COPE Guidance dostupne su na: https://publicationethics.org/)

activities and all forms of ownership, so the topic of each of them is covered by the scientific policy of the journal. All types of scientific and professional papers significantly contribute to the value of the journal.

EDITORIAL POLICIES

The editorial policies of the journal are aligned with the Regulation on Categorization and Ranking of Scientific Journals („Službeni glasnik RS" No. 159 of December 30, 2020).

Instructions for authors are provided in every issue of the journal.

The journal publishes original scientific and review scientific papers and professional papers that have received positive reviews from reviewers. Each author bears moral and ethical responsibility for the data published in the paper.

The editor-in-chief and members of the editorial board are obliged to take all reasonable measures to ensure that reviewers remain anonymous during and after the evaluation process, in accordance with the procedure. The list of reviewers is published in the first issue of the journal each calendar year.

Reviewers are obliged to provide a professional and timely evaluation of the value and accuracy of the research to the editor-in-chief.

In its work, the editorial board applies the Committee on Publication Ethics (COPE) Guidelines, which address the basic policies and practices needed by journals and publishers to achieve the highest standards of publishing ethics (COPE Guidelines available at: https://publicationethics.org/).

ORIGINALNOST RADA I BORBA PROTIV PLAGIJATA

Uz rad, autori dostavljaju i izjavu o autorstvu i autorskim pravima, kojom potvrđuju da je rad njihovo originalno delo.

U slučaju da redakcija časopisa sama ili posredstvom recenzenata otkrije da je rad koji je predat za objavljivanje plagijat, u prvom narednom broju časopisa biće objavljena informacija o tome da je odnosni autor predao rad koji je plagijat, i biće navedeno originalno delo iz kog je plagijat uzet. Takođe, radovi istog autora neće se ubuduće objavljivati u ovom časopisu.

Po potrebi, biće obavešteni autor originalnog rada i redakcija časopisa u kome je taj rad objavljen.

ORIGINALITY OF WORK AND FIGHT AGAINST PLAGIARISM

Authors submit a statement of authorship and copyright along with their work, confirming that the work is their original creation.

If the journal's editorial board, either independently or through reviewers, discovers that the submitted work is a plagiarism, the information about the author submitting a plagiarized work will be published in the next issue of the journal, along with the reference to the original work from which the plagiarism was taken. Additionally, works by the same author will no longer be published in this journal.

If necessary, the author of the original work and the editorial board of the journal in which the original work was published will be notified.

UPUTSTVA AUTORIMA

Radove pripremiti u skladu sa sledećim uputstvom:

RUKOPIS

Rukopis se predaje u elektronskom obliku (MS Word) na srpskom ili engleskom jeziku. Uz rad se obavezno dostavlja i pisana izjava autora o tome da je rad originalno delo. Priloge za časopis dostavljati na e-mail adresu: **revizor@rsm.rs**

Uslov da rad uđe u proceduru recenziranja jeste da u potpunosti zadovoljava tehničke kriterijume koji su propisani ovim uputstvom. Dostavljeni rad mora biti lektorisan, tj. mora da zadovoljava jezičke i pravopisne standarde srpskog odnosno engleskog jezika.

Dostavljati samo članke koji nisu bili niti će biti objavljeni pre štampanja u našem časopisu. Kod posebnih slučajeva postoji mogućnost dogovora sa glavnim urednikom.

Autori dostavljaju redakciji sve identifikacione podatke o sebi.

Uređivački odbor zadržava pravo na odlučivanje o prihvatanju dostavljenog teksta za objavljivanje i redakcijske intervencije na tekstu do obima koji ne zadire u strukturu rada.

JEZIK I OBIM RADA

Tekst se predaje na srpskom ili engleskom jeziku. Ako bude prihvaćen, biće objavljen na jeziku na kome je predat. Izuzetno, uređivački odbor može odlučiti da rad dostavljen na engleskom jeziku prevede na srpski, i obrnuto.

INSTRUCTIONS FOR THE AUTHORS

The papers are to be prepared in accordance with the following instructions:

THE MANUSCRIPT

The manuscript is submitted in electronic form (MS Word) in Serbian or English. The paper should be accompanied by the written Author's Statement of originality. The papers are submitted to the following e-mail address: **revizor@rsm.rs.**

Precondition for the paper to be accepted for the reviewing procedure is that it fully satisfies technical criteria according to the instructions given here. The paper has to be proofread before submission and must meet the criteria regarding the language (Serbian and English) and spelling.

Submit articles which were not and will not be published before printing in our journal. In special cases, there is a possibility of agreement with the editor-in-chief.

The authors have to submit their identification data to the editors.

The editorial office reserves the right to decide on the acceptance of the submitted text for publication and editorial interventions on the text to the extent that does not interfere with the structure of the work.

LANGUAGE AND VOLUME

The text is submitted in Serbian or English language. If accepted, it will be published in the language in which it was submitted. Exceptionally, the editors will decide that the text submitted in Serbian language is to be translated and published in English, or vice versa.

Obim predloženog članka treba da bude od 12000 do 30000 znakova sa belinama. Prikazi knjiga i drugi prilozi treba da obuhvate do 6000 znakova sa razmacima. Izuzetak ide po dogovoru.

ORGANIZACIJA RUKOPISA

Članak mora da sadrži sledeće elemente i to ovim redom:

1. **Podatke o autoru.** – Ime i prezime, zvanje (titula) autora, naziv institucije u kojoj je autor zaposlen (afilijacija); obavezno navesti e-mail adresu autora.
2. **Naslov rada.** – Naslov treba da je jasan i precizan.
3. **Sažetak (rezime, apstrakt).** – To je kratak informativni prikaz sadržaja članka, koji sadrži cilj istraživanja, metode, rezultate i zaključak. U pogledu obima, poželjno je da sažetak ima oko 600 slovnih mesta, uključujući i beline. Rezime se dostavlja na srpskom i engleskom jeziku. Sažetak članka treba da stoji između naslova rada i ključnih reči, nakon kojih sledi tekst članka.
4. **Ključne reči.** – Predstavljaju termine ili fraze koji najbolje opisuju sadržaj članka. Dozvoljeno je navesti do pet reči odnosno fraza. Ključne reči se dostavljaju na srpskom i engleskom jeziku, i stoje iza sažetka pisanog na odgovarajućem jeziku.

Primer:

Ključne reči: *prihodi, kapital, eksterna revizija, interna kontrola, računovodstveni standardi.*

The paper should have between 12000 and 30.000 characters, including spaces. Book reviews and other contributions should include up to 6000 characters with spaces. The exception is by agreement.

ORGANIZATION OF MANUSCRIPT

The article must contain the following elements, in the following order:

1. **Information about the author.** – Name and surname, title of the author, name of the institution where the author is employed (affiliation) and the author's e-mail address.
2. **Title of the paper.** – The title should be clear and precise.
3. **Abstract.** – This is a brief presentation of the article content, which contains the research goal, methods, results, and main conclusions. In terms of volume, it is desirable that the abstract has about 600 characters including spaces. Abstract are submitted in Serbian and English. It stands between the title and keywords, after which the text of the article follows.
4. **Key words**. – The terms or phrases which best describe the content of the article. It is allowed to write up to five words, i.e. phrases. Keywords are submitted in Serbian and English, and are behind the abstract written in the appropriate language.

Example:

Keywords: *revenues, capital, external audit, internal control, accounting standards.*

5. **Tekst članka.** – Centralni deo predstavlja tekst članka u kojem autor uz upotrebu odgovarajuće aparature obrađuje određeni naučni problem. Tekst dostaviti kucan fontom 10; svaki novi pasus ide bez uvlačenja reda i jednim proredom se odvaja od prethodnog pasusa. Naslovi i podnaslovi su bez numerisanja, centriranja i uvlačenja.
   Raščlanjivanje naslova ide najdublje do tri nivoa. Različiti nivoi naslova označavaju se prema sledećem primeru:

Primer:

PRVI NIVO NASLOVA: BOLD, VERZAL

Drugi nivo naslova: kurent

Treći nivo naslova: kurziv

   Tabele po mogućnosti dostaviti i odvojeno u excelu.
   Grafikone zajedno sa izvornim podacima, ilustracije i ostale priloge obavezno dostaviti odvojeno od teksta kao prilog tekstu koji dostavljate.

6. **Popis korišćene literature.** – Posle teksta članka, daje se popis korišćene literature i to abecednim redom po prezimenima autora.
   Kod navodenja korišćenih izvora od strane drugih autora obavezno je označiti izvor.
   Popis se daje prema niže izloženom **Uputstvu za citiranje**, s tim da se godina izdanja stavlja odmah iza imena

5. **Text of the article.** – The central part is the text of the article in which the author uses appropriate tools while processing the writing of a scientific paper. Text should be typed in font 10; each new paragraph goes without indenting and is separated from the previous paragraph by one line spacing. Titles and subtitles are without numbering, centering and indentation.
   Depending on the text, the titles can have different levels. Therefore, the following method is used for marking different title levels.

Example:

FIRST LEVEL OF THE TITLE: BOLD, UPPERCASE

Second Level of Title: Bold, Title Case

Third level of the title: Italics, sentencecase

   Tables should be submitted separately in Excel if possible.
   Graphs, together with original data, illustrations and other additions must be submitted separately from the text as an attachment to the text you are submitting.

6. **List of used literature.** – After the text of the article, the list of used literature is specified in alphabetical order by authors' last name.
   When citing sources used by other authors, it is obligatory to indicate the source.
   The list is given according to the **Citation instructions**, with the year of publication coming right after the author's,

autora odnosno urednika. Na kraju navođenja članka ili rada u zborniku navode se stranice na kojima se nalazi citirani rad.

7. **Navođenje korišćene literature u tekstu.** – Korišćena literatura referiše se u tekstu stavljanjem u zagrade, a piše se prezime autora i godina izdanja, naprimjer: (Jović, 2018.), a u slučaju citata navodi se još i broj stranice (Jović, 2018: 78). Svaka referenca navodi se kao i prvi put. Ako je reč o dva autora, oba prezimena navode se u zagradama, a ako ih je više, navodi se samo prvi autor: (Jović i saradnici, 2018.). Svaka referenca mora se navesti u popisu literature.

   Osnovni stil pozivanja na literaturu u tekstu prikazan je na sledećoj tabeli:

i.e., editor's name. At the end of the information on an article or a paper in the collection of papers, the pages of the cited paper are given.

7. **Citing used literature in the text.** – Used literature is referred to in the text in parentheses, and the author's last name and year of publication are written, for example: (Jović, 2018), and in the case of citations, the page number is also given: Jović, 2018: 78). Each reference is given as the first time. If there are two authors, both surnames are given in brackets, and if there are more, only the first author is listed: (Jović et al., 2018). Each reference must be listed in the bibliography.

   The basic style of referring to the literature in the text is shown in the following table:

Broj autora / Author type	**Navođenje u zagradi / Parenthetical citation**	**Narativno citiranje / Narrative citation**
Jedan autor/One author	(Luna, 2020)	Luna (2020)
Dva autora/Two authors	(Salas & D'Agostino, 2020)	Salas and D'Agostino (2020)
Tri ili više autora/ Three or more authors	(Martin et al., 2020)	Martin et al. (2020)
Grupa autora sa skraćenicom/ Group author with abbreviation		
Prvo citiranje/ First citation	(National Institute of Mental Health [NIMH], 2020)	National Institute of Mental Health (NIMH, 2020)
Naredno citiranje/ Subsequent citations	(NIMH, 2020)	NIMH (2020)
Grupa autora bez skraćenice/ Group author without abbreviation	(Stanford University, 2020)	Stanford University (2020)

Izvor/Source: Official Source for APA Style The Publication Manual of the American Psychological Association, Seventh Edition (https://apastyle.apa.org/products/publication-manual-7th-edition).

Ne označavati posebno neke reči u radu, delove rada i slično podebljanjem, kosim slovima ili nekim drugim oblikovanjem.

Do not specifically mark some words in the paper, parts of the paper and the like in bold, italics or some other formatting.

UPUTSTVO ZA CITIRANJE

Kod navođenja korišćenih izvora drugih autora treba obavezno označiti izvor. Strogo izbegavajte fusnote. Izvor se navodi kao redni broj rada u spisku literature u zagradama, na pr. (2).

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Svendsen, S., & Løber, L. (2020). *The big picture/Academic writing: The one-hour guide* (3rd digital ed.). Hans Reitzel Forlag. https://thebigpicture-academicwriting.digi.hansreitzel.dk/

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Zambrano-Vazquez, L. (2016). *The interaction of state and trait worry on response monitoring in those with worry and obsessive-compulsive symptoms* [Doctoral dissertation, University of Arizona]. UA Campus Repository. https://repository.arizona.edu/handle/10150/620615

Evans, A. C., Jr., Garbarino, J., Bocanegra, E., Kinscherff, R. T., & Márquez-Greene, N. (2019, August 8–11). *Gun violence: An event on the power of community* [Conference presentation]. APA 2019 Convention, Chicago, IL, United States. https://convention.apa.org/2019-video

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CIP - Каталогизација у публикацији
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657(497.11)

REVIZOR : časopis za teoriju i praksu / glavni i odgovorni urednik Jozefina Beke Trivunac. - [Štampano izd.]. - 1998, br. 1- . - Beograd : Naučno društvo za upravljanje organizacijama, 1998- (Beograd : Skripta Internacional). - 24 cm

Tromesečno. - Tekst na srp. i engl. jeziku. - Drugo izdanje na drugom medijumu: Revizor (Online) = ISSN 2620-1461

ISSN 1450-7005 = Revizor (Beograd)

COBISS.SR-ID 140584199

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